

# The Iron Age

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## Critical Points in Mechanical Engineering.

The statical, or, as it is the custom to call him, the civil engineer, has advantages over his professional brother, the dynamical or mechanical engineer, which, says the *Engineer* (London), it is to be feared he does not always appreciate. When a bridge, for example, has been properly designed and sufficiently well made, it will perform duties for many years without further attention than a painter is competent to bestow on it. A railway or a road, a dock or a tunnel, once made, are made for good, require no more thought, and will last for generations. The case is different with machines. After they are made they have to be worked, and the mere working of them sometimes entails difficulties and responsibilities which are greater than those involved in their original construction. This is especially true of certain machines of comparatively recent origin, which present continually what we have called critical points. In homely or expressive phraseology, whole machines in some cases, parts of machines in others, are worked within an inch of their lives, and nothing but a consummate knowledge of the conditions under which they can exist and operate, manifested by those in charge of them, keeps such machines alive. To the outside world the inner life of, for example, the engines of a great Atlantic steamer, is a sealed book. Much the same may be said of a locomotive engine. Great guns are worked very near the critical point indeed. We might go on to name a great many other examples of what we mean were it necessary. The kind of knowledge necessary to manage a steam engine very near the critical point is one that cannot be acquired by books. It is quite outside the ken of professors; Cambridge knows nothing of it; it is entirely independent of mathematics; it can only be learned by actual practice, and then only by those who have carefully trained themselves to observe. We once met on board ship a civil engineer of small experience in mechanical work, who yet spoke with much intelligence and knowledge of his subject about the pair of marine engines, then of a somewhat novel type, by which the vessel was propelled. It was for some time taken for granted that he had been at sea as a marine engineer, and when he explained that this was not the case, he was asked, with some surprise, how he came to possess a knowledge that could not be got from books. His reply was simply, "By keeping my eyes open whenever I went into an engine-room." This keeping the eyes open makes all the difference, very often, between a man considered highly competent and another who is not. But leaving men, let us give, as far as can be given on paper, a few examples of critical points in mechanical engineering.

One which suggests itself almost at once is the condition of the machinery of a hard-pressed vessel, let us say, on a trial trip. Here the maximum possible duty has to be got out of engine and boiler. It is very often touch and go whether the boilers prime or not. If they do the fires must be eased at once by opening the furnace doors. If this will not suffice up go the ash-pit dampers, but simultaneously down goes the steam pressure. To counteract this the feed is stopped. Do what can be done, the result of priming under such circumstances is disastrous. Many of our readers will remember how, being in charge of a stoke-hole, they have watched the gauge glasses and the pressure gauges with anxious eyes, while they now cautioned, now urged the firemen under their charge. The success of a splendid trial trip has often hung on a hair, and has only been secured by consummate skill on the part of those in the boiler-room; but very little is ever heard about this. Need we say that in the engine-room the difficulties are still greater. If bearings are slack, the engine will thump itself to pieces; if tight, any rubbing surface may get hot at a moment's notice. Only those who have had actual and painful experience know how short a time is needed to render a slipper guide literally red hot. This is no figure of speech. The mischief can be done almost without a moment's warning. The first intimation the engineer has is the unmistakable and very hateful smell of a hot bearing. Well for him if he does not see sparks flying in another minute. There can be no doubt that in almost, if not all, cases the crank-shaft bearings of all large steamers are only kept cool by the unceasing vigilance of the engineers in charge. It is all very well to say that this is all wrong; that it ought not to be so;

that crank-shafts ought to run cool, and would if properly proportioned. The sea-going engineer knows better. He will take a ship to Australia and never have a hot bearing, but he knows that the credit is not due to the bearings, but to his own skill and judgment; and there are so many things to be thought of. A hot bearing will probably be followed by a split or cracked crank-pin. Why? No one knows. In like manner, a crack in a crank pin, as fine as a hair, will make the big end heat. Why? No one knows. A great many men think they know. We may leave them to hold their belief in peace; we shall not disturb them.

Success in dealing with critical points in marine engineering depends on knowledge of what often appear very little things, but in reality there is nothing small or trifling about the management of machinery taxed to its utmost. Take, for example, such a matter as the cooling of a crank-pin with water. If the pin has once got thoroughly heated, water must not be put on the big end. The service pipes must play on the crank webs. If attention is not paid to this the brasses are almost certain to be cracked or broken. Take a hot thrust carriage again; an injudicious use of the hose will properly result in cracking the cast iron—yet how tempting it is to turn a jet on the hot

premium to incompetence. Locomotive engines hauling an express train daily do their very best—are worked their very hardest from one end of the 100 miles or so of the run to the other. They are worked under extremely critical conditions—not, be it understood, critical in the sense of dangerous—but critical in the sense that they may fail to do the work expected of them, and lose time. The least mistake about water, or fire, or lubrication, and all is over: time is lost, and can never be made up. The consummate skill, exercised unconsciously, with which a first-rate driver and fireman will jockey a locomotive and get the last mile an hour out of it must be seen to be appreciated; and we may add that can only be appreciated by one who understands why some things are done and others left undone. The perfection of engine driving under difficulties is seen, however, on torpedo boats running their trials, and the wonderful success which has been achieved bears powerful testimony to the skill of those who take charge of the machinery after it has been made. It is, we think, a noteworthy fact that, taken all round, no engineers in the world are superior to those of Great Britain, in dealing with machinery worked under critical conditions. They do not know when they are

other machinery requiring a fast-running engine. The engines are all tested and thoroughly inspected before leaving the works.

The engravings make further description unnecessary, as they show clearly some of the main features.

## Notes on Russian Petroleum.

According to the *Journal* of the Franklin Institute, three forms of stills are in use in the refineries of the Baku district—viz., the upright cylindrical still of wrought iron, the so-called wagon-body still and the horizontal cylindrical still. The last of these forms is almost exclusively used in the larger refineries. A large number of these horizontal cylindrical stills are generally placed side by side, and so are fed with crude naphtha from a common pipe, which runs along in front of the row, with short vertical branches delivering the oil into each still. The hot-oil residues are taken off from the lowest part of the still by wide pipes, which connect with a common horizontally placed pipe; and, as by the breaking of these pipes, filled with highly-heated residual oils, dangerous fires could readily ensue, which would make it impossible to

tained are, in some cases, so high that wrought-iron is fused thereby, so that the bottoms of stills, heat-pipes, &c., must be protected from immediate contact with the flame of the "furnace." Of course, this "astatki" serves as the material for the manufacture of lubricating oils, but the amounts obtained are so large that the greater part is still used for fuel, so that not only is all distilling done with the aid of it, but it is used throughout the entire district for steam generating both for stationary engines and for ships and locomotives. Thus the steamships of the Caspian Sea, and, in part those of the Black Sea and of the river Volga, the locomotives of the Trans-Caspian, the Trans-Caspian and other Russian railroads make use of this "astatki" as fuel.

Although the results vary somewhat, the percentages of the several products may be given as follows:

	Boiling point.	Per cent.
Benzine (with gasoline) . . . . .	— to 150° C.	5 to 7
Kerosene I (burning oil) . . . . .	150° to 270° C.	27 to 38
Kerosene II (solar oil) . . . . .	270° to 330° C.	5 to 8
Residues . . . . .	330° to —	50 to 60

These residues, which make up one-half or more of the total crude oil distilled, show a sp. gr. of 0.900 to 0.910, and, although, as compared with American petroleum residues, they show extremely small amounts of Paraffine, they yield on distillation a considerable amount of oils, which, on account of their viscosity, their low cold-test and high fire-test, are among the best mineral lubricants known. The manufacture of lubricating oils is, however, just beginning to develop. Taking the production of crude oil in 1885 at 16.4 million metric centners (11,714,286 barrels), and assuming the production of 56 per cent. of residues we would have 9.2 million metric centners (6,571,428 barrels) residues. If 1,000,000 metric centners of this be allowed for the needs of the refineries for fuel, steam generating, &c., we still have 8.2 million metric centners (5,571,428 barrels) for the lubricating-oil manufacture. This yields on an average 30 per cent. of lubricating oil, which would amount, therefore, to over 3,000,000 metric centners (2,125,714 barrels). But the lubricating-oil production of Baku and the surrounding district does not yet amount to the tenth of this, being in 1885 only 260,000 metric centners (185,714 barrels).

The amount of residues needed for fuel in the distillation of lubricating oils amounts to 20 per cent. of the charge, instead of the 3 or 4 per cent. mentioned before as necessary for the burning-oil distillation. In connection with the transport and the marketing of the oil, the Nobel Brothers, as said before, have been the most active. They had, in 1884, for use on the Caspian Sea and the Volga, a flotilla of 69 ships, one-third of the number being steamers, and for railroad traffic about 2000 tank cars. They had, moreover, extensive storage tanks at all prominent points in Southern Russia, and even as far north as St Petersburg and Riga. Some 900 tank cars are also in use on the line of road between Baku and Batoum, on the Black Sea, and a pipe line for this distance is projected. Tank steamers for the transport of Russian oil in bulk between St. Petersburg and Stettin and Lübeck, in Germany, are now building.

The Decapod locomotives built last year by the Baldwin Locomotive Works for the Northern Pacific Railroad are now at work in construction on the Cascade Mountain division. The engines have been a surprise to the mechanical department of the road, owing to the unexpected ease with which they pass round the sharpest curves. They will go anywhere that an eight-wheel engine can go. The switchbacks for crossing the Cascade Mountains are almost finished, and the road will be in operation within two months. The Decapods will then be used for pulling the trains up the steep grades. The tunnel, which will reduce the grades to 116 feet to the mile, the maximum grade used on the Northern Pacific Railroad, will not be completed for two years.

The new material, "lithanode," for the plates of secondary batteries, was recently brought before the British Society of Telegraph Engineers and Electricians by Mr. Desmond G. FitzGerald, its inventor. Lithanode, which was first brought to notice about a year ago, is a coherent peroxide of lead, with more or less sulphate of lead, which is highly conductive and has in general a specific gravity between 7.5 and 7.9.

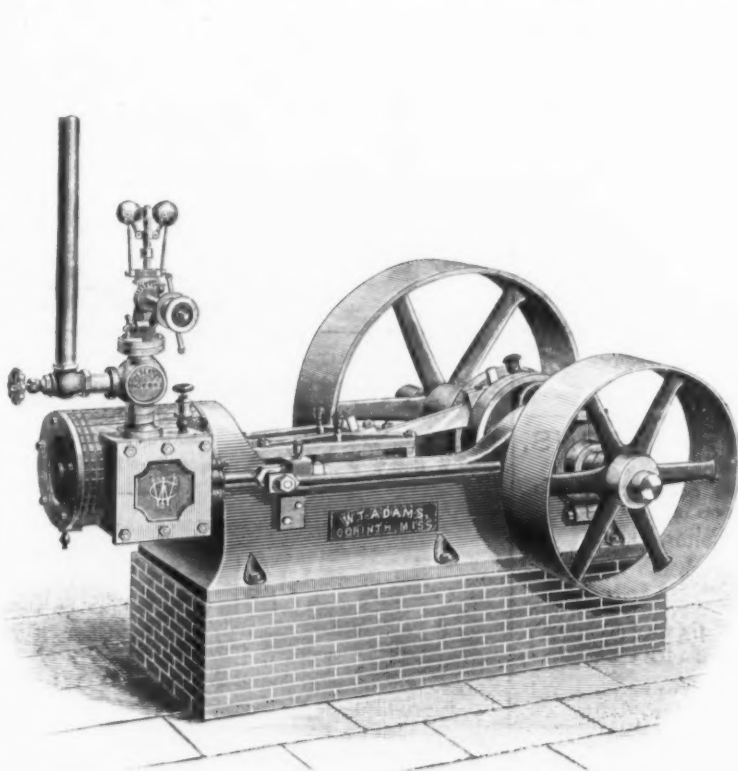


Fig. 1.—Side View.

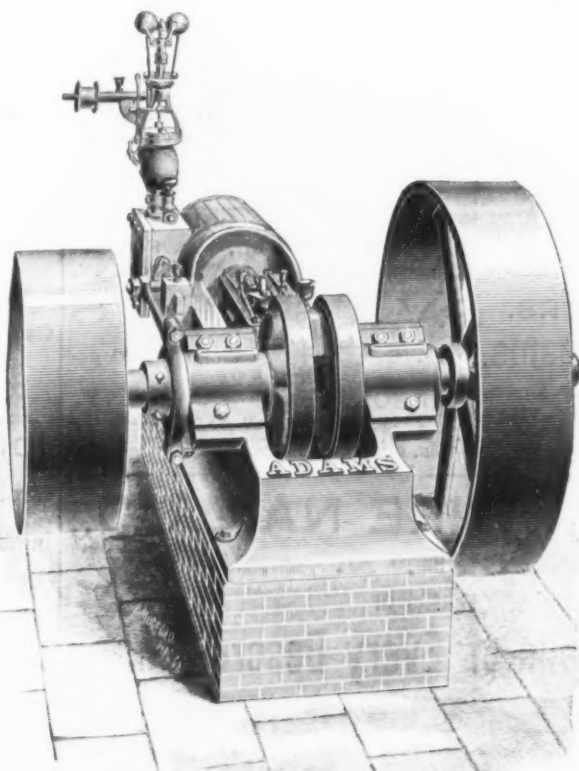


Fig. 2.—Rear View.

A NEW CENTER-CRANK ENGINE, BUILT BY THE CORINTH IRON WORKS, CORINTH, MISS.

metal! It may be said again without fear of contradiction that success or failure in working machinery at or about the critical point is a question of attention to small details. Writing, as we are now, for our younger readers, we make no apology for enforcing a lesson in the best possible way—namely, by supplying an illustration drawn from actual practice. On an important line of railway in the South of England a powerful locomotive was doing all it could to keep time with an exceptionally heavy express train crammed with passengers. The run had been nearly accomplished, when, entering a tunnel, the driver smelt the smell which there is no mistaking. Taking an oil can, he went out on the running board and found a piston-rod hot and the packing burning. The moment he applied oil it flamed up and ignited the oil on the guide bars, already warm enough. The next moment the cross head seized, and before his eyes the engine was wrecked. The connecting-rod broke at the small end; the motion plate was bent; one link, with its eccentric rods, was torn down. The fireman on the foot-plate shut off steam, and, strange to state, the engine ran for nearly a mile in the condition we have described. The train drew up at its platform, and of the hundreds of passengers who had safely completed their journey, not one knew anything about the accident. The cause of the breakdown was a trifle. The stuffing-box was steam-tight, and the driver did not think the gland needed screwing up. The packing was really slack, and the bush in the cylinder end worked out, seized a little on the rod, and made it so hot that it burned the packing. All the rest followed as we have stated. Here we see that the difference between success and catastrophe lay in screwing or not screwing up a gland.

It may be said that machinery never ought to be worked within an inch of its life, so that there should be no critical points. This might be done, but only at the cost of seriously diminishing its utility, and we may perhaps add, holding out a

beaten. They have audacity enough to dare anything. They know how to let well alone; and while attending to a hundred things *seriatim*, they attend to but one thing at a time. They keep their heads; they are obedient to those in authority; and they make no noise. Under the most trying circumstances an engine-room staff will do their work in absolute silence. We are apt in the present day to take mechanical triumphs as matters of course. When we hear of such ships as the *Etruria* or the *Alaska* flying across the Atlantic we praise, and justly praise, the builders of the ship and her machinery; but we are, we fear, prone to forget that the engineers in charge of this machinery have onerous duties to perform, and that any lack of skill and judgment would render the labors of engine and shipbuilder nugatory. The machinery and boilers of our ocean racers are worked very close indeed to the critical point.

## A New Center Crank Engine.

We show on this page two views of a new counterbalanced center crank engine, built by the Corinth Iron Works, W. T. Adams, proprietor, of Corinth, Miss.

The engine is of good design generally, and is turned out in five sizes, 12, 15, 20, 25 and 40 horse-power. The main journals are very large and well fitted. The valve, which is an ordinary slide, and the piston-rod, as well as the main shaft, connecting-rod and strap, are all of steel. The steam and exhaust ports are well proportioned. The cross-head is of the locomotive type, and the governor is arranged with an automatic stop, so as to prevent serious accident in case the governor belt should give way. The main-shaft boxes, it will be noticed, have diagonal caps, providing for regular adjustment, both vertically and horizontally, without the use of side gibbs or loose parts. This engine being self-contained and counterbalanced is capable of making very high speed, and is well adapted for sawmill and

get to the connections of these pipes with the stills to close the valves from the outside, the valves are placed inside the still, while the valve stems reach through the still and project above, where they are easily accessible. In the Nobel refinery an open trench, through which water is kept continuously running, is laid along before the row of stills, so that all dripping oil is carried away at once, and the ground and space near the stills does not become saturated with oil—a most fruitful source of danger.

Quite frequently *dephlegmators*, or so called "separators," are interposed between the helmet of the still and condenser, so that the vapors of the burning oil distillate are separated from the lubricating oil mechanically drawn over with them. These condensed, heavier vapors either flow back by a separate connection into the still or into a distinct receptacle, and afterward serve for the manufacture of what is called "solar oil," a grade of illuminating oil. One of the characteristic features of the Baku petroleum distilling is the almost exclusive use made of "astatki," or oil residue, for fuel. The great scarcity of wood or coal in that country caused both crude oil and its distillation products to be used for fuel from the beginning of the operations there. Professor Engler states that the heating values of these residues is almost double that of bituminous coal, and that ordinary burners using this "astatki" can evaporate twelve times the weight of water compared to that of fuel used, while the best burners, with 1 kg. of "astatki," can evaporate 14 to 15 kg. of water. Three to four parts by weight of these residue oils used as fuel will suffice to carry on the distillation of 100 parts of crude oil for the burning oil fraction.

The burner in which these residues are used, or "furnunka," as it is called locally, has various forms. The essential feature in all the forms is the atomizing of the oil by superheated steam, and the burning of it in this condition. The temperatures at



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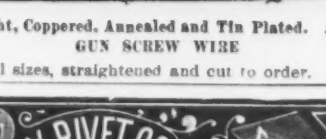
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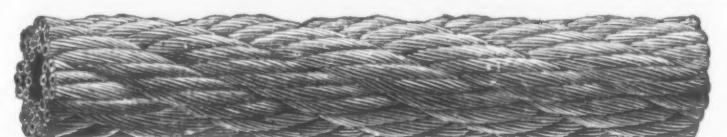
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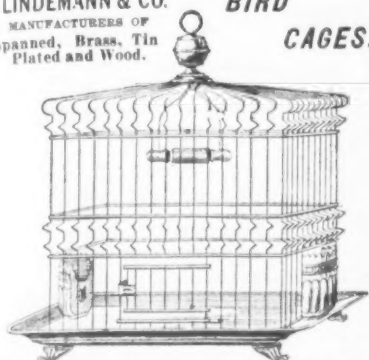
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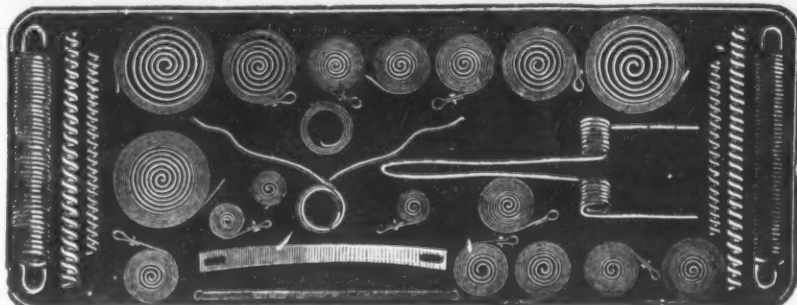
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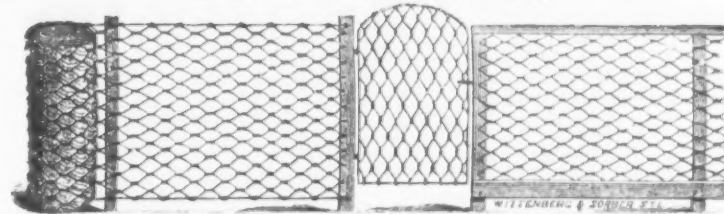
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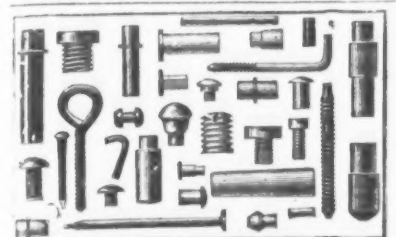
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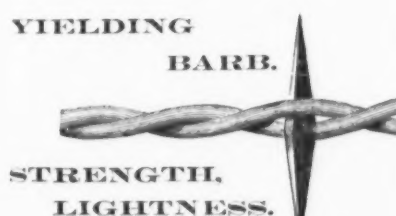
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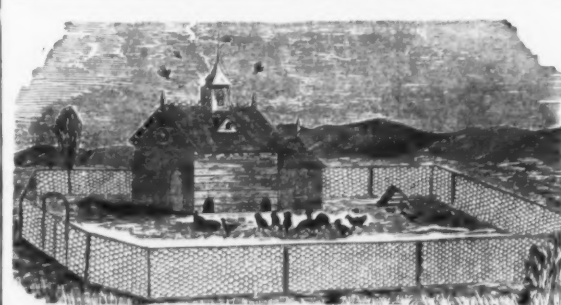
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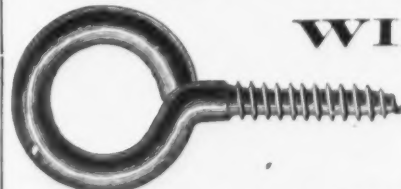
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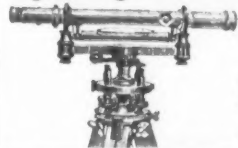
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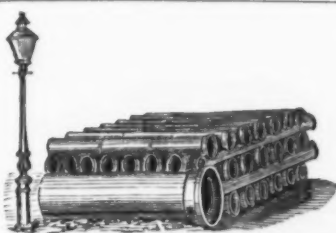
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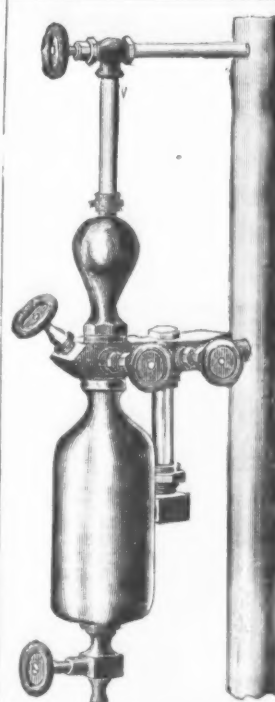
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# STEEL,

WARRANTED EQUAL TO ANY PRODUCED.

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IT MAKES A PERFECT GIMLET. IT IS EASY TO WORK. NEAT AND CHEAP.

By a very simple sliding attachment to an almost ordinary shaped screw driver, a tool is here produced by which the screw is held firmly to the driver, enabling the same to be started and driven in much less time, and without the least danger of slipping out of the slot, or toppling over of the screw. It is very valuable to use in corners, overhead, or any place unobtainable by a screw driver, one hand can hold the work, while the other drives the screw; and to drive it home the jaws are simply pushed back without stopping driving and without taking the driver out of the slot.

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This is a well-made, strong tool, the blade and jaws are of best quality steel, polished brass mountings and ebonized handles.

MEDIUM SIZE, NEARLY 10 INCHES LONG OVER ALL.

Silver Medal awarded at Novelty Exhibition, Philadelphia, 1885.

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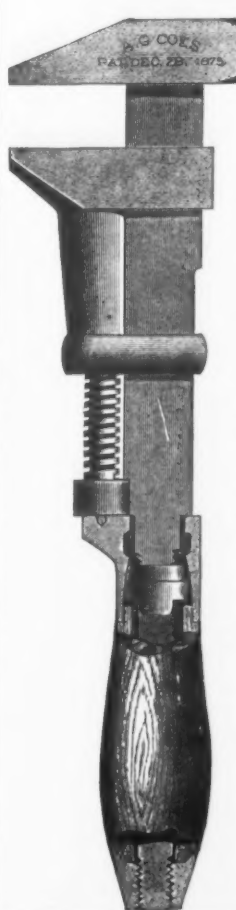
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**A. G. COES' PATENT  
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The Strongest Wrench made, and the only successful re-enforced bar.

The Ferrule is firmly secured in place by a nut screwed on the bar.

Particular attention is called to the way in which the handle is made and fastened to the shank.

This Handle is made better and stronger than heretofore by using our new Cup Tip at the end which encloses the wood and keeps it from splitting. This is the only wrench which has the wood handle firmly secured and held together at each end, and it will stand more rough usage and last longer than any now made. It is not affected by heat, cold or moisture.

None genuine unless Stamped,

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Case-Hardened Throughout. Parts Interchangeable.

This Wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.



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The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken another can be furnished adapted to either jaw with no express designation. The slides, nuts and various parts are also interchangeable, thus easily repairing the Wrench at very small expense, and with a perfect practicability for further use as when the Wrench was new. For Circulars and Price List, address

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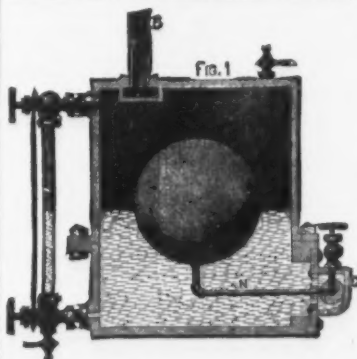


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Awarded first and only Prize, Silver Medal, at the late  
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Prevents Sweating  
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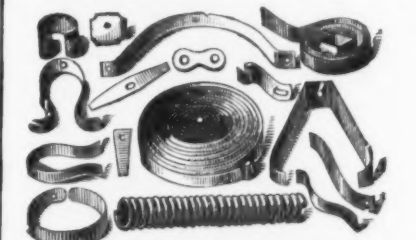
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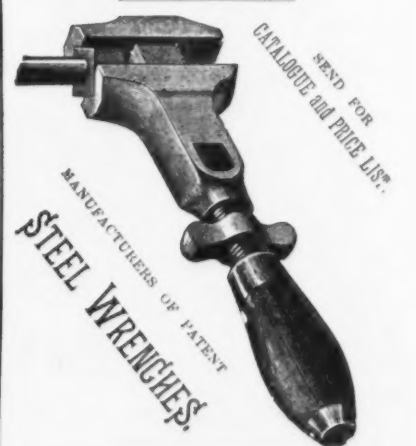
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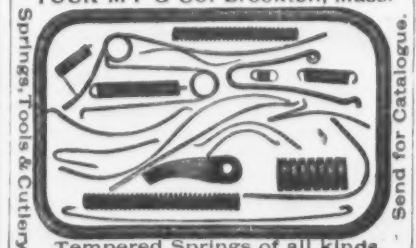
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**PUMPS**  
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Adapted to open and drilled wells. The  
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Simple, durable, powerful, easy to oper-  
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**MYERS' DOUBLE LOCK REVERSIBLE HAY CARRIER.**

A perfect reversible  
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Double and single har-  
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Manufacturers of  
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Windmill, Boiler Feed  
Horizontal and Rotary  
Pumps.  
Hydraulic Rams, Iron  
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**CYLINDERS**  
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HYDRAULIC MACHINERY.

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Tacks in an original form.  
Something new and at-  
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and Other Hydraulic Machines in the World.

Fig. 120.

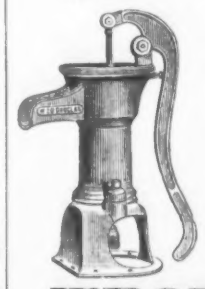


Fig. 209.



Fig. 70.



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One of the strong points of these sinks is the new coupling with which they are now supplied, and which  
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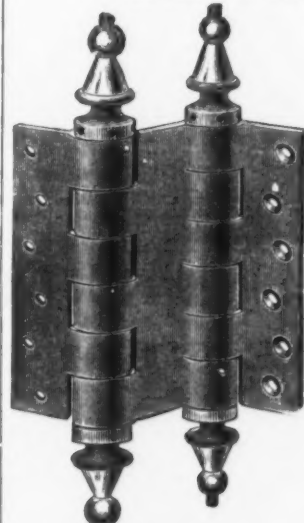
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LOOSE PIN REVERSIBLE, CAST FAST AND LOOSE,



Drilled and Wire Jointed, Japanned, Figured Enam-  
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Also a Full Line of

**IRON AND BRASS PUMPS,**

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Rams, &c., and all with the most modern improvements.

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We beg to call the attention of Architects, Builders, Dealers, and  
all interested parties, to our Spiral Spring Hinge, knowing it to be  
an effective and durable one, neat in appearance, easy to put on,  
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wire made expressly for us and for this particular purpose, with  
the view of great elasticity, durability and power. They produce  
a continuous pressure from the point where the door is wide open  
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no friction, the whole power of the Spring being exerted in swing-  
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will never get the wrong hand.

17" FINE CASTINGS A SPECIALTY.

New Britain, - Connecticut.

Warehouse: 103 Chambers Street, New York.

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Capacity, 1000 Kegs per Day

Made from their own Pig Iron, insuring Regularity and Superiority in Quality.

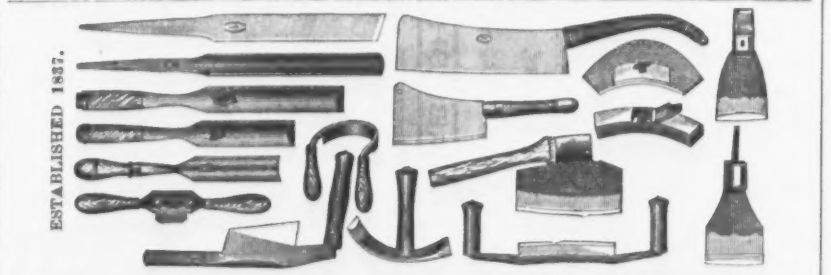
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Guaranteed to remove and prevent scale in steam  
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WIRE CLOTH FOR SUGAR REFINERIES. GERMAN CLOTH FOR CENTRIFUGAL MACHINES.

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Wire Work and Wire Goods of Every Description.

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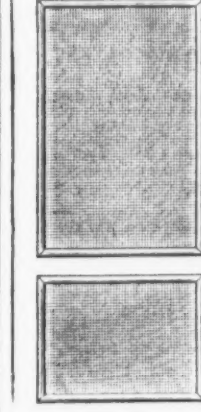
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ADJUSTABLE WINDOW SCREENS,

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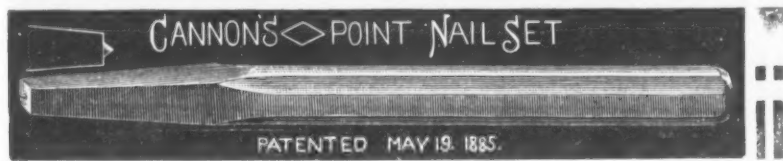


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PENNSYLVANIA FILE WORKS.  
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Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.



The object of this Diamond Point can be readily seen, in that it prevents the Set from slipping from the head of the nail while in use, thus saving in many cases some valuable piece of work.

IT IS FAST TAKING THE PLACE OF EVERY OTHER NAIL SET. ONCE SEEN MECHANICS WILL HAVE NO OTHER.

These Sets are carefully made from the BEST QUALITY OF TOOL STEEL. The Points are turned and thoroughly tempered, and will not break off.

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The Trade Supplied. Put up in Boxes 1/2 Dozen, 1 Dozen, 1/4 GROSS and 1 GROSS. Assorted Sizes.

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WEYMOUTH'S PATENT.





This Knife is the **BEST IN USE** for cutting down hay and straw in mow and stack-cutting fine feed from bale, cutting corn stalks for feed, cutting peat & ditching marshes. The blade is **Best Cast Steel**, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives. They are nicely packed in boxes, 1 dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

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We are informed that various parties are infringing upon the widely-known Letters Patent granted originally to GEORGE F. WEYMOUTH for an improved Hay Knife. The invention patented to GEORGE F. WEYMOUTH is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. **IT IS OUR PURPOSE TO PROSECUTE ALL INFRINGEMENTS,** and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits are now pending in the U. S. Courts. **ALL manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives, made as described above, which are not of our genuine manufacture.**

EAST WILTON, Sept. 1, 1886.



**W.H. CARTER'S PATENT NEEDLE HAY KNIFE.**

PAT. APR. 29, 1884.

IMPROVED BY M.M. BARTLETT.

Improvement Patented April 28, 1885.

**SOLE MANUFACTURERS OF CARTER'S IMPROVED NEEDLE HAY KNIFE, THE BEST IN THE WORLD.**

Improvement patented April 28, 1885, of which we are the sole manufacturers, has been tested with the most celebrated knives of other makers, and has proved an easier and faster Cutter than any other. Its special excellence consists in the chisel-edge tooth shown in the engraving. It may be used for cutting hay in the mow, stack and bale; also for ditching, cutting peat, or any other work for which a hay knife is used. It can be readily ground by the most inexperienced, as it requires to be ground only on one side. Should a tooth break, all that is necessary to replace the damage is to grind it once and a new chisel-tooth appears. It can ordinarily be sharpened with a common scythe stone. Try one and you will give it the preference.

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THE J. BARTON SMITH CO'S PATENT SCREW TANG FILES

As a guarantee of the superior quality of Screw Tang Files over all others for any that are unsatisfactory as to temper, &c, we will give in exchange two for each one that is returned to us. One Handle will last a lifetime in constant use, making it the cheapest Handle in the World. Cost 10 cents each.

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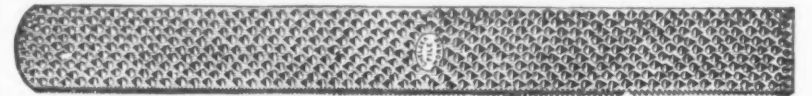
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**Button's Pat. Wire Cutter and Plier Combined.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

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**THE GEM HAY KNIFE.**

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We desire to call special attention to our patent "Gem" Hay Knives, which are rapidly gaining in favor with the public. They are made from the best Cast Steel, tempered in oil, and their peculiar construction enables us to do the work with greater ease and rapidly than with any other knife.

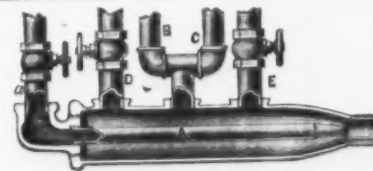
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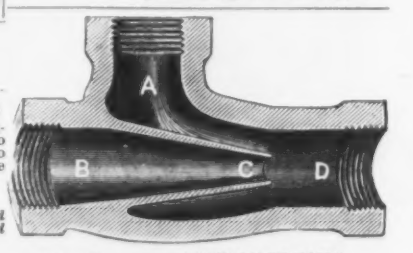
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For reducing and giving an even pressure, regardless of pressure on Boilers. For Paper Mills, Heating Apparatus, Sugar Refineries, &c.



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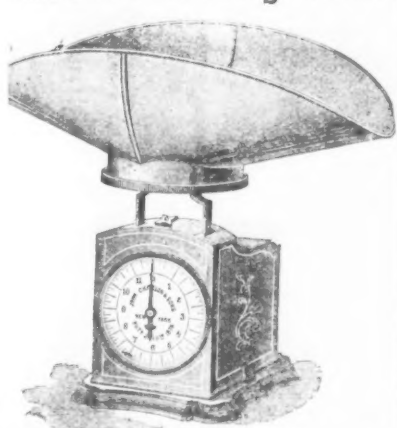
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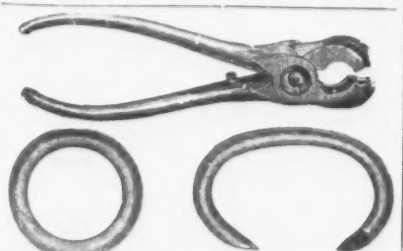
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**Trommsdorff's Chemicals; Joseph Kavalier's Superior Bohemian Glass; Schleicher & Schnell's Chemically Pure and Common Filter Paper; E. March Suchne's Acid Proof German Stoneware Professor Jolly's Spiral Balances.**

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FENCE AND MARKET WIRES,

Wire Nails, Fence Staples and Steel Wire Mats.

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Patent Floor Plane.  
No. 74. 2 1/2 inch Cutter, \$4.50.

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ABSOLUTELY  
FIRE PROOF,  
Light and Cheap.

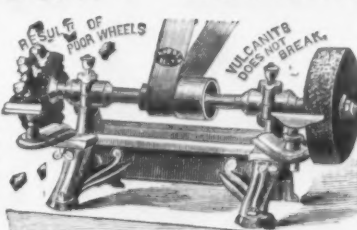
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MINERS and MANUFACTURERS. BRAIDED PACKING, MILL BOARD, SHEATHING and SPECIALTIES.

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## SWIFT RUNNING EMERY WHEELS.



THE ORIGINAL  
SOLID VULCANITE

## EMERY WHEELS

Runs Easy and Safe,  
Cool and True.

Is More Durable — Hence Cheaper.  
A trial will convince you of this.

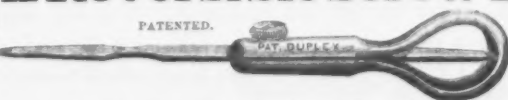
## NEW YORK BELTING AND PACKING CO.,

J. H. CHEEVER, Treas.

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## Duplex Reversible Screw Driver.

TWO SIZES IN  
ONE, AND AT  
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BEST CAST  
STEEL  
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C. THOMAS & CO.,

Manufacturers,

BIRMINGHAM, CONN.

## Steel Projectiles.

In a recent article on "Steel Projectiles," *Engineering* says that the leading manufacturers of chrome steel projectiles in France have at present orders in hand for the French and Russian Governments which, when completed by the end of 1888, will place the war departments of these two countries in possession of 7,000 and 12,000 tons respectively. The British Admiralty will, on or about the end of the current fiscal year, have in store 600 steel projectiles of similar make, part of which are being furnished by Firmly and the remainder by Holzer, Messrs. Firth & Sons, of Sheffield, are in a position to turn out 1000 tons of steel projectiles a year, so that by the end of 1888 the English Government may, through them, rely upon having 2000 tons, less than one-fourth in the French arsenals and one-sixth of the Russian supply. The marvelous trials with steel shell fired against thick iron plates in December last at Gavres, as well as the experiments made last autumn at Shoeburyness, demonstrated beyond doubt that the guns have once more triumphed over armor, and that in any naval engagement the chances of success must be in favor of the ships able to fire projectiles that will pierce the thickest armor afloat, as against those vessels firing shell which will crumble against moderately thick plates. Yet that will be the position of England should she become involved in war with France or Russia at an early date. A country to which tradition has assigned the proud rank of mistress of the seas, and whose actual existence is dependent upon demonstrating when necessary the truth of that tradition, can at present only arm her fighting ships with shell, the impotency of which against heavy armor is but too well known. Two years from now England will probably have 5000 or 6000 rounds manufactured by Messrs. Firth & Sons, but if no other English maker should follow their spirited example, the Admiralty must either rely on purchasing from French makers a dangerous and unworthy expedient or trust to Providence and chilled cast iron.

## The Chicago Tire and Spring Works.

On the 21st ult. Judge Shepard, of the Illinois Superior Court, delivered an opinion in the dispute between the stockholders of the Chicago Tire and Spring Works which will, for the present at least, settle existing differences. The works manufacture railroad tires and springs at Melrose, Ill., a short distance from Chicago. Frederick M. Atkinson has been president of the company and Charles H. Ferry, treasurer. It appears that Ferry had advanced the company about \$100,000 and received stock, besides which Atkinson authorized him to vote 500 shares of his (Atkinson's) stock. Atkinson was alleged to have drawn out more money than he was entitled to, and, desiring to oust Ferry, he confessed judgment for the works for \$20,000 last January to the Linden Steel Company, of Pittsburgh, on an indebtedness not due for 60 days. Ferry paid this money in cash in court after banking hours, and thus annulled the judgment. Atkinson then filed a bill and procured an injunction which restrained Ferry from voting his (Atkinson's) stock, which the latter had authorized him to vote, at a coming meeting of the stockholders. In that way Atkinson secured a majority of the stock at the meeting, and turned out the old directors, of whom Ferry was one, and elected himself, Eli Smith and Joseph Kretzinger, directors. Immediately following this the Union National Bank and William H. Ferry entered up judgments by confession against the company for over \$100,000, and on creditors' bills secured a receiver. Atkinson came in and moved to discharge the receiver, while Charles H. Ferry moved to dissolve the injunction restraining him from voting Atkinson's stock. Judge Shepard decided these motions. He refused to discharge the receiver and dissolved the injunction against Ferry. This reinstates Ferry in the management of the company, and it is announced that he will continue to supply money for it, and the company will continue its business.

An order has been entered by Judge Jackson in the United States District Court, at Wheeling, in the case of Nimick & Co., of Pittsburgh, against John Bruce and others, West Virginia stockholders of the Mingo Iron Works, which failed in 1872. The suit has been pending for years, the purpose being to enforce against West Virginia stockholders the double liability clause of the Ohio corporation law. The Supreme Court of West Virginia threw the case out of the State courts, where suit was entered in the United States Court. A number of the stockholders demurred. Judge Jackson overruled the demurrers, and gave the defendants till August 1 to plead to the complaint. Judgment was taken as confessed against 17 of the late stockholders, who have not answered in court, for sums ranging from a few hundred to \$9000, and aggregating about \$43,000.

Mayor Hugh O'Brien, of Boston, has vetoed an order permitting the Boston Heating Company to lay wooden pipe under the streets to convey water at a high pressure, according to the Prall system.

## Foreign Markets.

### FRANCE.

PARIS, March 25, 1887.—Metals.—Business has continued to slowly improve since our last weekly report without changing prices. We therefore repeat quotations as follows: Copper—Cath Bars, 101.50 @ 105 francs @ 100 kg.; Ingots and Slabs, 102.50 @ 105 francs @ 100 kg.; and Pure Croco Ore, 101.50. Tin—Barra, 275.75; Billeton, 275. Straits, 271.25, and English, 272.50. Lead, 32 @ 32.75, and Spelter, 35.5 @ 36. Iron.—Business in the French iron market has on the whole been rather dragging, but it nevertheless is an encouraging sign that at least in this city, where prices were most depressed hitherto, they have been firmly sustained during the week. We quote: Flooring Iron, 14.50 francs @ 100 kg., and Merchant ditto, 14. In the interior there is a movement on foot to

build narrow-gauge railroads more extensively this year, which in some localities has an encouraging effect. In the Northern Department orders are dropping in but sparingly and specifications are delayed whereas in the Haute Marne district the inquiry for Merchant Iron may be said to be steady and satisfactory. Prices there are fairly sustained, the prevailing impression being that the present quotations of 13 @ 14 francs may be proven in the near future. Wire Rods are not so much rather neglected. Mixed Iron is ranging 14 @ 15 francs. Axle works are very busy. On the other hand, Wire Nails are in diminished request, No. 18 not bringing over 21 @ 22.50 francs @ 10 kg. In the Department of the Gard axle works have struck for higher wages. The production of Pig iron in France last year has been 1,507,850 tons, against 1,394,948, showing a decrease of 122,758 tons. Of Fi ished iron the report has been 777,211 tons, against 824,231. It has therefore been 12,217 tons less than during the previous year. Steel production was limited to 40,503 tons, against 53,539 in 1886, showing another falling off of 8,036 tons.—*Monteur des Interets Metallurgiques.*

### BELGIUM.

BRUSSELS, March 25, 1887.—Iron.—Finished iron has continued active, many works now being booked for a long time in advance, the orders dropping in chiefly running on Sheet Iron and Merchant Iron. All orders that have been received since the beginning of the year have been duly continued since, iron masters meanwhile clinging firmly to the syndicate price list. Manufacturers of Thin Sheets have made fresh contracts for six months to come on the basis of 10 @ 33.50 francs @ 100 kg. as to gauge. The demand for Pig Iron, both domestic and for export, continues remarkably brisk. Consumers, however, would take large amounts if the slightest concessions were made them, but none of the makers feel disposed to make the least abatement. The fact is that they are most of them engaged to the full extent of their capacity all the way to the 1st of July next. Beams remain firm at 10.50; Merchant Iron commands 11 francs; Sheets range from 13 francs No. 2 to 21 francs No. 4, while Steel Sheets without difficulty bring 16 @ 17. Steel works generally in Belgium have got orders for months ahead. As for the export trade to South America, Belgium has carried the day in some Argentine contracts, with positive promises of very handsome Brazilian orders near at hand.—*Monteur des Interets Metallurgiques.*

### GERMANY.

HAMBURG, March 25, 1887.—Iron.—The outlook in Rhenish-Westphalia has gone on improving almost daily. Associated blast-furnace owners firmly maintain their price list, causing the rolling mills to follow suit. In this manner the general aspect of the iron trade is developing a remarkable degree of strength, fortified by the liveliness with which consumers readily take whatever they require at the full rates demanded. Every kind of Pig Iron and Spiegeleisen is stretched by the diminished stocks noticeable, and as for Foundry Pig in particular the out, it has been disposed of for six months in advance. The conversion in the rolling mill brands embraces Steel likewise, and Merchant Iron cannot now be had for anything below 110 marks @ ton. Throughout the line Sheets are firmer than ever. Structural iron also exhibits great firmness, in view of a prosperous building season at hand. Wire Rods have not ceased to be liberally taken for export at unaltered figures. In Upper Silesia the 25 blast-furnaces in operation to the full extent of their capacity find no difficulty in disposing of their make locally and for export, and, as the rolling mills continue to be looked upon as ever, the general situation in that part of Germany may be called decidedly sound, the more so as all producers are now clinging to prices in most harmoniously. Wire works are also in receipt of most satisfactory orders extending beyond the first six months of the year. They for the moment decline naming prices beyond that period. Metal has remained quiet. Lead has been no change in Copper, and Spelter is firm.—*Borsen-halle.*

### HOLLAND.

ROTTERDAM, March 23, 1887.—Tin.—The market opened at 62.25 guilders @ 50 kg. spot Banca, and 62.50 @ 62.75 deliverable from the Banca sale, while Billeton brought 62 on the spot and 62 @ 62.50 afloat. Subsequently the demand subsided, and a weak feeling set in, causing Banca to close at 62 @ 62.50 spot and futures, and Billeton at 61.25 @ 61.50, with but few buyers.—*Koch & Lierboom.*

### SPAIN.

BILBAO, March 12, 1887.—Metals.—Following are the official figures of Spanish exportation during the last three calendar years:

	1884.	1885.	1886.
Tons.	Tons.	Tons.	Tons.
Calamine.....	38,350	34,055	26,624
Pyrites.....	17,908	781,892	621,297
Iron Ore.....	3,967,002	3,750,944	4,520,326
Ingot Copper.....	19,310	36,354	27,003
Quicksilver.....	1,193	1,015	541
Pig Lead.....	118,266	117,640	104,471
Total.....	4,752,624	4,762,400	5,108,671

Iron Ore.—For England in particular a brisk demand has continued to prevail, contracts having again been made on a large scale. At the same time buyers are becoming scarcer, some of the companies may find it difficult to deliver the ore sold at the time stipulated. On the spot sales have been restricted at 7.5 @ 7.9 for Campina, and 7 @ 7.5 for Rubos. During the week a large amount left our harbor for abroad, say 10,250 tons. Shipments by the Prussia Railway are going on smoothly now, on Thursday last no less than 900 tons having passed over the line. Total shipments so far this year 192,531 tons, against 191,533 last year same time. Pig Iron.—A limited export and a brisk coastwise trade were the characteristics of the week.—*Bitmo Maritimo y Comercial.*

### AUSTRIA.

VIENNA, March 23, 1887.—Iron.—The demand has been concentrating here and elsewhere in Austria, Hungary on Structural Iron in particular, but the general position has lost none of its strength and encouraging aspect. From Hungary in particular advice is of a most encouraging kind, especially as regards Merchant Iron. At the same time the hardware and agricultural implement branches display an earlier revival than usual. Wire Nails, long depressed, have taken the lead in the upward turn inaugurated. Our market is a firm generally at following rates: Pig Iron, 3 @ 40 francs @ ton; Merchant Iron, 10 @ 12.5 @ 100 kg.; Sheets, 14 @ 17.5, and Beams, 112 @ 115. Metals.—We are able to report greater animation, coupled with increased firmness. Following are the prevailing quotations: Copper, 50 @ 59 francs @ 100 kg.; Lead, 17.50; Spelter, 19.50; Tin, 115 @ 120; Antimony, 36, and Quicksilver, 225.—*Handels-Journal.*

### RUSSIA.

ST. PETERSBURG, March 23, 1887.—Iron.—The new Minister of Finance, Mr. Wischnegradsky, as a protect must be ready to yield on almost every point to which manufacturers consider themselves entitled to, in their struggle against foreign competition. The consequence is that a further notable raising of import duties is in prospect, not only in European but in Asiatic trade likewise; hence a special committee composed of manufacturers and merchants is to be appointed by the government to take this matter in hand. The plan has been agitated to levy duties on goods manufactured in Poland, although the latter is one of the provinces of the empire. Whether the Government would go so far in lengthening its doubtful, but at any rate the attempt will be made to counteract the success which Prussian Silesian ironmasters have had so far in establishing important works across the frontier, the point is directed against them in particular. Petroleum.—An American agent has of late been negotiating with the banking house of Rothschild in London about the acquisition of all the petroleum wells near Batum in the Caucasus. It is stated that this is a movement on the part of certain eating parties interested in the point in the United States to get control through joint action with the Rothschilds of an important industry beginning to seriously threaten American interests in it as regards certain localities in Europe where the American market was so far supreme. Meanwhile the German-Russian Naphtol Import Company is striving to secure suitable real estate at Batum for the erection of large warehouses and tanks. There is considerable complaint at Batum about the insufficiency of rolling stock on the new Trans-Caspian railroad. At several points along the line there is such a lack of accommodation that thousands of tons of grain for the want of proper shelter have been exposed in the open air and thoroughly spoiled by the rains.—*Journal de St. Petersbourg.*



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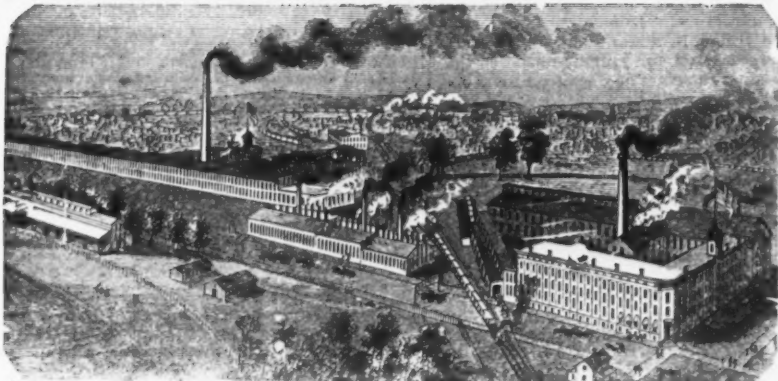
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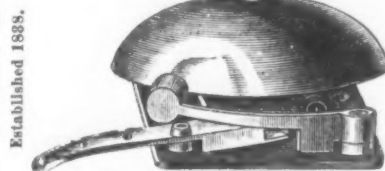
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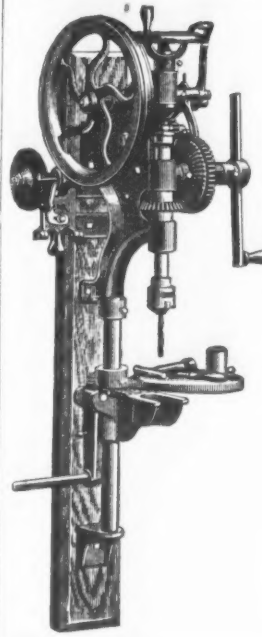
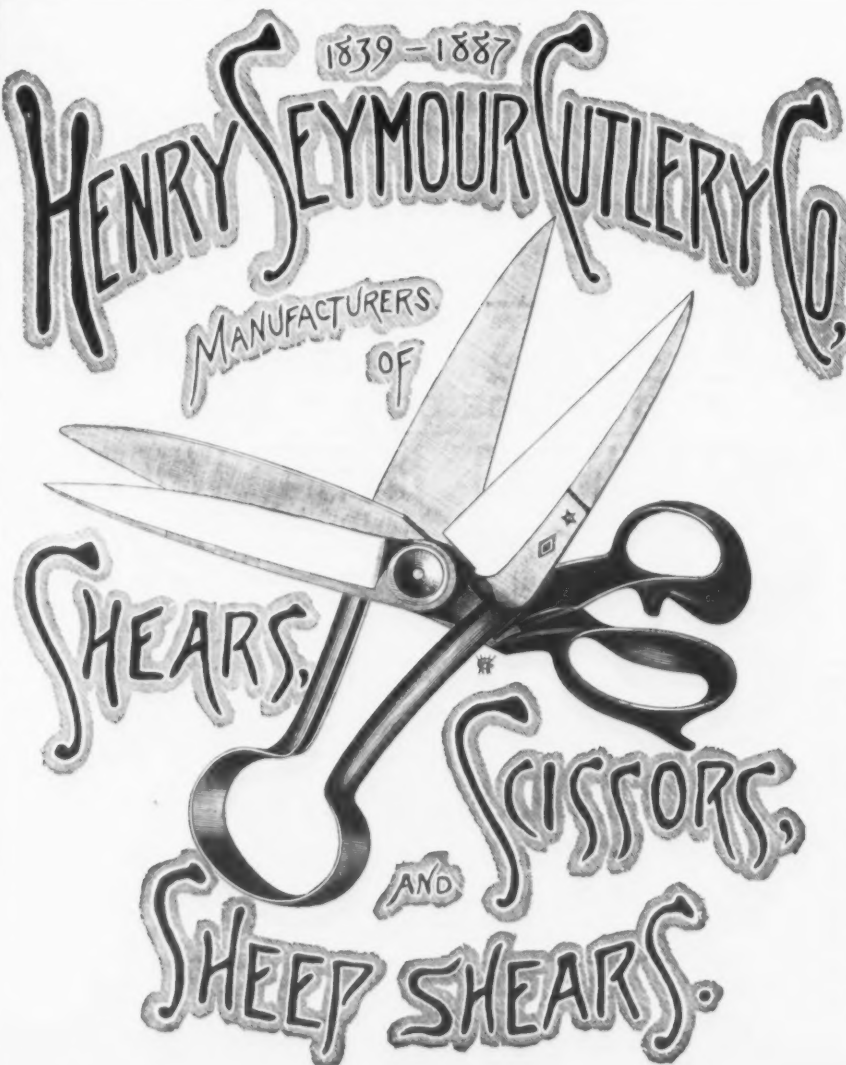
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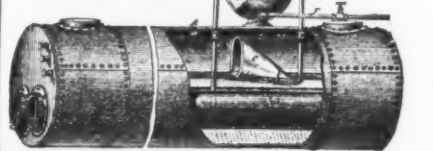
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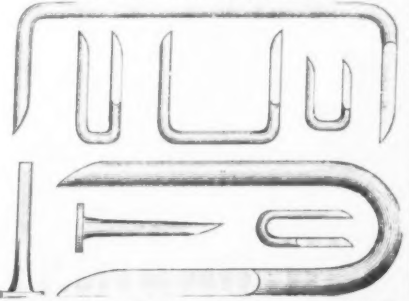
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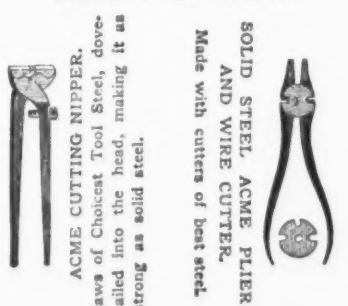
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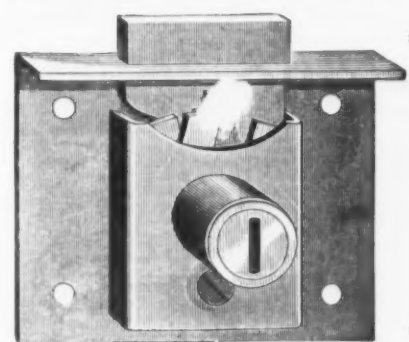
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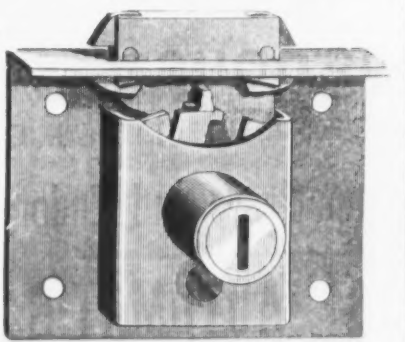
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CATALOGUES ON APPLICATION.

### Chimney Construction.

BY C. POWELL KARR, C. E.

An impression prevails in the minds of some builders that a chimney foundation is a good place to get rid of bats, culls, spawls or other refuse brick but no impression could be more unwise or injurious to them. A bad foundation is a builder's worst enemy, and for his own future welfare he should insist upon carefully selecting the stock that goes under ground. All masonry is sure to settle, and all precautions that can should be taken to insure a uniformity in this settling. A building may be finished, but not completed, for of no building can it be said it is completed when carelessness or ignorance has been displayed in laying its foundations. As soon as the courses below ground are laid and the last course allowed at least 12 hours to set, it would be well to fill up the trench or excavation, either with gravel of a uniform size, if it can be obtained, or soft coal cinders or broken stone. Where it is possible the writer would urge strongly upon the builder to put in his foundations in the fall of the year, any time before the coming of the first frost, and permit the foundation to settle and adjust itself to its surroundings until the ensuing spring the work will be so much more satisfactory that in a very high chimney—say, one exceeding 200 feet, it should be made a rule. A good foundation is the corner-stone of good building. An arch is made at the base of the chimney for the entrance of the smoke-flue, and in order to balance this weakening of the wall a similar opening is made on the opposite side. It also serves to admit workmen to make necessary repairs or clean the main flue. The arches to these entrances should be built of wedge-shaped bricks, molded or rubbed, so as to fit the radius of the soffit. This method will enable the mason to make a thorough bond as in a wall. The brick voussoirs of the arch are in two concentric rings, and should be laid to a line on the centers, with a close joint of cement mortar; or, in case of the fire-flues, in fire mortar. If the radius of the segmental arch is made equal to the width of the opening the effect will be pleasing, and the thrust of the arch will be well taken by the chimney walls. The designing and erection of scaffolds for large work have become a special business, and we can only mention a few of the methods in vogue. Where time is not an object to be considered and the chimney stands alone, an exterior scaffold may be dispensed with. The workman rests upon temporary supports upon the interior of the chimney, and bricks and mortar are supplied to him by means of a rope and pulleys attached to a beam of wood or crane that rises with the chimney. One man and a helper can in this way build a chimney as fast as is consistent with good workmanship and durability for all chimneys below 80 feet in height. If an exterior scaffold or staging is used it should be built independent of any support from the chimney itself. Sometimes the scaffolding is used as a means of support to the chimney during erection, but this is wrong in principle, for it prevents the proper adjustment of the chimney's load. In building an iron chimney sometimes a device is resorted to known as a "flying scaffold." It consists of cross arms or bearers resting on angle irons, riveted to the inside of the wrought-iron plates as erected. These bearers carry an internal platform and an iron tube, with cross-head timbers at the top, from which is suspended an outside platform, so that men can work both inside and outside at once. The scaffold must be raised each time a complete ring of plates is riveted up. This is done by two beams being placed across the top of the completed ring of plates, each beam being provided with two large nuts, through which screw-ropes are worked. Near the bottoms of the four screw-ropes ratchet wheels are fixed, and the four ratchet wheels are worked simultaneously until the whole scaffold has been raised the required height, and the cross-arms or bearers brought up to the level of the next set of internal angle irons, to which the scaffold is secured. The next ring of plates is then commenced, and so on. Where internal scaffolding is used care should be taken to support the horizontal beams on the brickwork, and not upon vertical posts, for in the settlement of the walls, were the beams to be mutually supported by both posts and brickwork, the posts would act as fulcrums to the beam as levers, and thus cause seams or cracks in the walls. The holes made in the masonry to support the staging should be immediately filled up with bricks and mortar after the removal of the frame to the next higher level. It may happen in constructing the foundations that a difficulty will occur in obtaining water-lime. Pure lime may be made hydraulic by the addition of iron hammer scales, such as may be obtained from bloomeries, puddling mills or forge shops. The proportions are given by Mr. Bancroft as: Lime, 2; scale, 1; sand, 5; total, eight parts of measure. Good sound building brick, free from cracks, flaws, stones or lumps of any kind should be used throughout, and they should be burnt so thoroughly that upon breakage a partial vitrification will appear throughout. This may be tested by a knife, which will hardly make an impression unless the brick has been under-burnt. When two thoroughly burnt bricks are struck together a clear, ringing sound will be emitted—a dull sound would indicate a soft or shaky brick. It is only by using good brick and mortar that uniformity in the construction can be secured. As a precautionary measure to insure good bonding, hoop-iron bands from 1 to 1½ inches in width and from ¼ to ½ inch in thickness are laid in the bed joints at intervals of from 3 to 4 feet in height. These bands should be most carefully protected from rusting by being dipped in boiling tar and well sanded to take a better hold upon the mortar, and should be laid in cement mortar. If dampness penetrates the tar covering, oxidation will set in and the rust forming cause an expansion which will open up the joint of the brickwork; and care should be taken to bed the hoop iron in the common brickwork and not in the fire brick. The length of hoop iron in each bed joint in which it is laid is twice the

circumference of the chimney at that joint. In rectangular chimneys that iron bars from ½ to ¾ inch in thickness, and from ¼ to 1 inch wide are used to good advantage, tarred and sanded in the same manner, and at both ends folded over at right angles, so as to embrace from two to three courses. They are laid in the bed joint transversely to the brick, and with the hook ends downward.

Many chimneys consist of two shells or cones, an inner and an outer shell. The outer shell, having an exterior batter of 0.015 to 0.025 per foot of height, while the thickness at the top is from 4 to 9 inches and the bottom from 16 inches to 2 feet. Between the inner and outer shells is an air space varying from ½ inch to 3 inches, and this space in many large chimneys is used for ventilating purposes. The interior face of the outer shell follows generally the outline of the outer face without, however, any precise degree of exactitude. The outer face of the interior shell may be plumb or conform to the general slope of the outermost faces. The interior faces of the inner shell are arranged in a series of divisions, one above another, the thickness being uniform in each division, but diminishing upward from division to division. The thickness of the brickwork at the top of the inner or outer shell may be one brick length from top to 20 or 25 feet below, and wherever this point comes let it be the limiting line of the division, the next division being one and a half bricks length in thickness from 20 to 50 from the beginning of this new division, measuring always from the top downward, and then for each new division increase the thickness by half a brick length for each 20 or 25 feet. If, however, the inside diameter at the top exceeds 4½ feet the top length should be one and one half brick lengths in thickness. Whatever height it may be decided to make one division it would be best to make them all uniform. The inner cone or shell when built of fire-brick of regular dimensions should be built up distinct and separate from its adjoining shell by from ½ inch to 1 inch air space. In a large chimney this would make two air spaces and three shells, but in some instances the fire brick section is built to the top and forms the inner shell itself. In all cases the inner shell should be built clear to the top. Again, a superior kind of hard-burned brick capable of withstanding without burning a heat of 1200° F. can now be had of a size uniform with common brick at a price of about \$13 per 1000 at New York, and they can be bonded in and built up with the inner shell through as many divisions as may be required and at a great saving in cost over the regular fire-brick. They should be laid in fire clay, however, not in lime mortar. But in chimneys designed for egress of hot air from reverberatory, puddling and other high temperature furnaces it will be necessary to use the regulation fire-brick. Sometimes openings, slanting upward from the outside, are made in the outer shell near the top, so that currents of air passing through and upward will impinge upon the topmost rim of the inner shell and form an induced current, thus aiding the natural draft. It will also aid in counterbalancing these downward swirls of the wind that drive the smoke down the chimney. Suppose we have a chimney 100 feet high and its draft power is equal to a head of 73 inches of water, now this is equal to a wind having a velocity of nearly 47 feet per second, which is a very fair breeze, and if this were blowing in a direction opposed to the direction of the horizontal flues it would nullify the draft, and this brings us to a question of dampers. The area of a damper depends upon the height of the chimney, and where there is only one boiler it may have the same area as the chimney if that is properly proportioned to the power of the boiler. Mr. Box gives the rule that the area of the damper in square inches per horse-power is equal to 110 divided by the square root of the height of the chimney in feet. The form of the damper is determined by the cross section of the flue. Thus, for a chimney 65 feet high above the fire-grate, the damper should be equal to 13.64 square inches per horse power, and for a 70 horse boiler we would have a damper of about 20 x 47 inches or 30 x 31 inches.

In most large factories there is only one chimney for all the furnaces. The advantages are a saving in the cost of construction, a uniformity of draft which is difficult to obtain where only one furnace discharges its gaseous products into the chimney, and, lastly, greater efficiency in the work of the furnaces and boilers. Where a furnace has a special chimney the draft is variable. This in degree is small at first, but increases as the ratio of combustion. Where doors are opened to stoke the fire the draft is considerably interfered with, but where several furnaces are connected with a common chimney the draft will increase up to a certain limit with the number of fires that are in communication with the chimney. The pressure of the wind upon a cylindrical chimney is but one half of what it is upon a square chimney of the same diametrical section, that of a hexagonal shaft about three-quarters of the square, and of the octagonal about seven-tenths. Factory chimneys should stand alone, not only on their own foundations, but the walls should not be connected with the walls of any other building, unless it may be that of a small boiler house. A chimney should not be connected by masonry of any description with the walls or foundations of the factory to which it belongs. Its own weight upon its bed footings is so much greater per square foot than the weight of the adjoining buildings upon their foundations, that if connection is made its settling will either produce cracks in the factory walls or its own walls will yield to the unequal pressure.

Chimneys are generally terminated by a projection or series of projections called a chapter, and while not essential to the work of the chimney it satisfies the eye by its architectural effect. They should be built of light material, such as porous brick or terracotta, and are generally surmounted by an iron plate or stone coping, to prevent the injurious effects of water soaking in the vertical joints, thus protecting them from wind, rain and frost. The horizontal external joints should be what is technically



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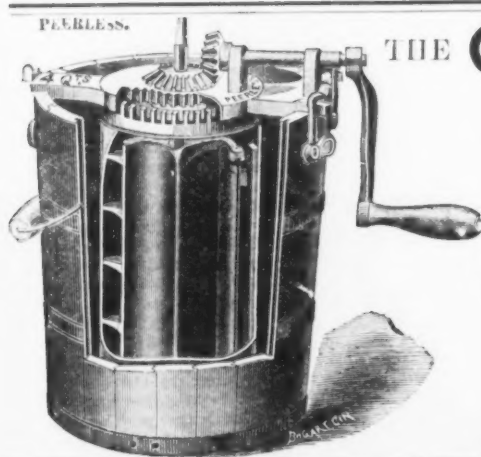
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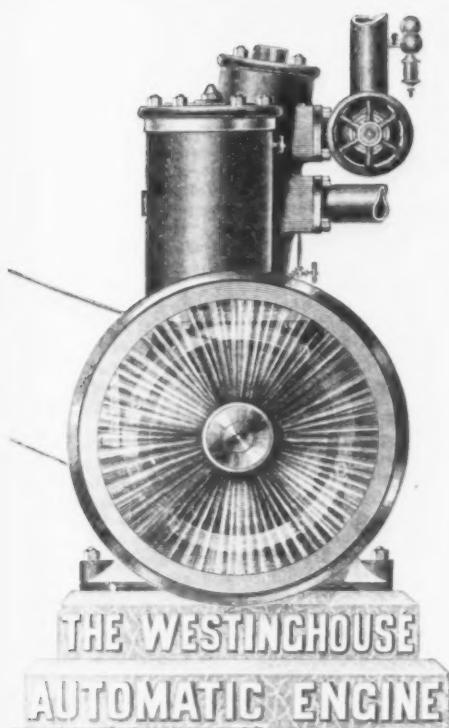
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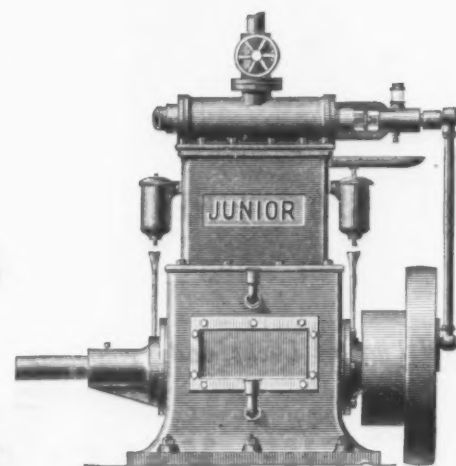
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PARKE & LACY, San Francisco, Cal.  
UTAH & MONTANA MACHINERY CO., Salt Lake, Utah.  
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**TEAL'S**

Portable Hoist,  
Patented, April 8, 1884.  
Advantages claimed.

- 1st. Being made with Spur Gears and at the same time sustaining the load at any point.
- 2d. One man of ordinary strength is capable of raising the load for which each hoist is built.
- 3d. The ability of rapidly raising or lowering the empty hook by pulling on the lift-chain, instead of the slow and tedious process by the hand chain.
- 4th. Being provided with self-oilers, always lubricated, which adds both to the ease of lifting and the life of the hoist.

TEAL HOIST COMPANY  
(Limited), 148 Broad St.  
(South from 225 Race) Philadelphia.

**N. Y. Mallet & Handle Works,**

Manufacturers of  
Calkers', Carpenters', Stone  
Cutters', Tin, Copper &  
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**MALLETS,**  
Hawking, Booting, Haws-  
ing and Calking Irons  
also all kinds of Handles,  
Sledge, Chisel and Ham-  
mer Handles.

Also  
Cotton & Bale Hooks  
Patented Feb. 13, 1877, a  
new combination of  
Hooks.  
456 E. Houston Street,  
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**TACKS.**

**F. R. EMMONS & BRO.**

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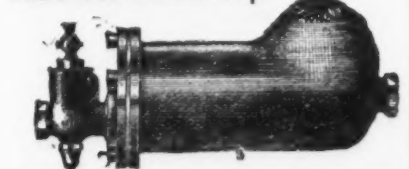
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Cor. Broadway and Wall St., New York.  
Bankers and dealers in COMMERCIAL PAPER.  
Stocks and Bonds dealt in for cash or on margin at  
New York Stock Exchange.

**MACHINISTS' SCALES.**

PATENT END GRADUATION.  
Liberal Discount to the Trade. Send for List.

**COFFIN & LEIGHTON, Syracuse, N. Y.**

**The Curtis Steam Trap.**

Has automatic air discharge; has a differential open-  
ing, thus discharging all the water as fast as it comes.  
Is very accessible for cleaning the valve being on the  
outside. Send for circular. Manufactured by the

**CURTIS REGULATOR CO.,**  
61 Beverly St., BOSTON, MASS.  
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icago, Ill.; 210 So. 3rd St., Minneapolis; 207 Market St.,  
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Improved Screw Cutting  
**LATHES** Foot & Power  
Drill Presses, Chucks, Drills,  
Dogs, and machinists' and am-  
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Catalogues mailed on application  
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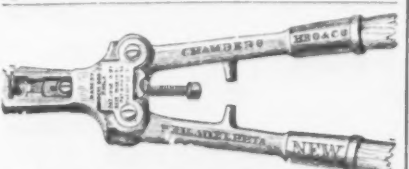
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Manufacturers of Copper, Brass and Iron Rivets;  
Common and Swedes Iron Leathered, Carpet, Lace  
and Gimp Tacks; Finishing, Hungarian, Trunk,  
Clout and Cigar Box Nails, &c. Rivets made to  
order.

NEW YORK AGENCY.  
**DISOSWAY & HENDERSON,**  
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Agents for the Philadelphia Star Carriage and Tire Bolts.

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For cutting off the ends of Bolts and Rivets, on  
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where you buy your hardware, or send for cir-  
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**NEW YORK BELTING & PACKING CO.**

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THE OLDEST AND LARGEST MANUFACTURERS IN THE UNITED STATES OF

**VULCANIZED RUBBER IN EVERY FORM ADAPTED TO MECHANICAL PURPOSES****MACHINE BELTING**

WITH SMOOTH METALLIC RUBBER SURFACE.

THIS COMPANY HAS MANUFACTURED THE LARGEST  
BELTS MADE IN THE WORLD FOR THE PRINCIPAL  
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RUBBER TEST HOSE.  
COTTON "CABLE" HOSE. CIRCULAR WOVEN SEAMLESS  
ANTISEPTIC FOR THE USE OF STEAM AND HAND FIRE  
ENGINES, FORCE PUMPS, MILLS, FACTORIES, STEAM-  
ERS AND BREWERS.

**CAR SPRINGS OF A SUPERIOR QUALITY**

Original Solid Vulcanite Emery Wheels.

**PATENT ELASTIC RUBBER BACK SQUARE PACKING.**

BEST IN THE WORLD.

FOR PACKING THE PISTON RODS AND VALVE STEMS OF STEAM ENGINES AND PUMPS.

**CORRUGATED RUBBER MATS AND MATTING.**

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BRANCHES: 308 Chestnut St., Phila.  
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**PAGE BELTING COMPANY,**

We manufacture  
all the sta-  
ple and special grades  
of Leather Belting.

Also the "Hercules" Lacing  
and the Putna Brand Lacing.

The Hercules is com-  
bines the good  
and of Page's Pat-  
ent. Try it.

Send for Catalogue  
of Belting to use



No. 17, and "Kinds and Grades  
for Different Kinds of Work."

**CONCORD, N. H., U. S. A.**

**H. A. ROGERS,**

No. 19 John St.,  
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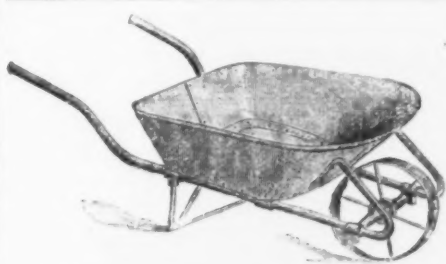
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**SUPPLIES.**

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SCOTCH GAUGE GLASSES.

SOLE AGENTS FOR TANITE EMERY WHEELS

**BUCK BROTHERS, MILLBURY, MASS.**

The Most Complete Assortment in the U. S. of

**Shank, Socket Firmer and Socket Framing Chisels PLANE IRONS.**

CAUTION.—Buyers should be on their guard and not have inferior goods passed on them by unprincipled  
persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have  
on our trade-mark also, "Riverline Works."

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MANUFACTURERS OF

Hardware Specialties

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Novelties in Iron, Brass

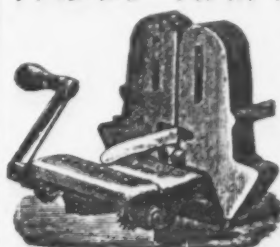
and Bronze.

Special attention paid to Electro  
plating in all its branches.

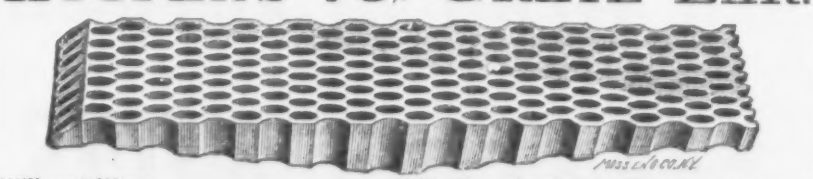
**H. & J. W. KING,****TABLE KNIFE POLISHING MACHINES**

GUHL & HARBECK'S PATENT.

These famous Polishers are the best and cheapest  
for cleaning, polishing and sharpening  
Table Cutlery.

**Francis T. Witte Hardware Co.,**

Sole Agents for United States and Canada,  
106 Chambers Street, New York.

**HOOPER'S 70% GRATE BAR.**

Will not Warp.  
Will not burn off at the ends.  
Will give absolutely 70% air space.  
Will give uniform combustion of fuel  
Send for Circular and  
Price List to  
**ALEXANDER TRAUD,**  
EAST FERRY STREET IRON WORKS,  
NEWARK, N. J.

known as "mason's joints." The chapter of  
very high chimneys should be built with  
cement mortar, because of its superiority  
over common mortar to resist the action of  
the elements. A most excellent cement in  
which to lay a stone coping for the chapter,  
or the last two or three courses of brick, can  
be made of two parts of blacksmith's ashes  
to three parts of clay to one of sand mixed  
with linseed oil. It will be found impervious  
to rain, wind or frost.

According to Professor Rankine, a fire-  
brick lining can be bonded with common  
brickwork in the ordinary way, provided the  
fire bricks are laid in fire-clay mortar and the  
ordinary bricks in common mortar. His reason  
for preferring this mode of construction to  
an internal fire-brick shell are: 1. When the  
fire bricks are bonded with the ordinary  
bricks they contribute together to the stability  
of the chimney, and so save an additional  
thickness of ordinary brickwork. 2. Unless  
the internal chimney is carried up to the top  
of the outer cone there is a risk of damage  
through the explosion of gaseous mixtures in  
the space between. 3. There is also a risk of  
the cracking of the outer cone at and near  
the upper end of the inner cone, through  
unequal heating at that place, unless the  
inner shaft is carried to the top of the outer  
one. In some of the largest chimneys, even  
with the most thoughtful and skillful pre-  
cautions, it has been found that after a short  
time a chimney, through unequal settling or  
some unforeseen special cause, has settled  
more on one side or deviated from its per-  
pendicularity, and a necessity arises of  
straightening it, which is done as follows:  
On the side opposite the direction in which  
the chimney leans the operation of cutting  
out courses of brick in several different  
places is begun near the base of the chim-  
ney; these are cut out rather more than  
half way across, depending, however,  
largely upon the amount of the deviation.  
The courses removed are replaced by others  
diminishing very slightly in thickness from  
the direction in which the chimney leans, so  
that the courses removed and replaced by  
others are sufficient to bring the axis of  
symmetry back to its true vertical position.  
In removing the brick the top and bottom  
joints are thoroughly cleaned off. Good  
hard brick, closely packed, replace the re-  
moved ones, and at the outer ends good oak  
wedges are inserted. Similar cuts are made  
right and left of the first cut and similarly  
treated. The wedges are gradually with-  
drawn after all the cuts are made, and if the  
work has been skillfully done the chimney  
will quietly settle back to its true position.

**Latest Treasury Decisions.**

The following late decisions in *extenso*,  
affecting iron and steel, have been issued by  
the Treasury Department:

**DRAWBACK ON STEEL SHANKS.**

On the exportation of "shanks" manu-  
factured wholly from imported steel, a  
drawback will be allowed equal to the duty  
paid on the imported material used in the  
manufacture, less the legal retention of 10  
per cent. The quantity of the material so  
used will be ascertained, for all "shanks  
with parallel edges," by adding to the net  
weight of the exported article 5 per cent of  
such net weight, and for "custom steel  
shanks," by adding to the exported net  
weight 35 per cent thereof.

**TUNGSTEN METAL NOT A SUBSTITUTE FOR STEEL.**

On an appeal from an assessment of duty  
at 20 per cent, ad valorem on certain tung-  
sten metal, the appellants claim that it is  
an alloy used exclusively as an admixture  
in small proportions to iron or steel intended  
for tools, and that it is therefore dutiable at  
the rates for "alloys used as substitutes for  
steel tools." The Department in affirming  
the assessment of the collector, says: "The  
merchandise in question is a substance in  
the nature of an alloy, obtained from wol-  
framite ore, and that it contains principally  
the metal tungsten, and several other metals  
in various small proportions. There is  
nothing, however, to show that said mer-  
chandise, if an alloy, is used as a substitute  
for steel or steel tools, while it is stated by  
the appellants themselves that it is imported  
for the sole purpose of being added in small  
quantities to steel or iron, which latter  
metals may be used after such admixture  
for the manufacture of tools. Therefore,  
not being used directly for conversion into  
tools, it is not one of the substitutes for  
steel, and that it was properly classified as  
an 'unwrought metal.'"

**CAR-WHEEL CENTERS NOT FORGINGS OF IRON.**

An appeal having been made from a party  
at the rate of 2 1/2 cents per pound on  
certain car-wheel centers, the appraiser re-  
ported the articles forgings of iron ad-  
vanced by other processes of manufacture,  
being bored out for the fitting of the axle,  
the hubs faced, and the rims turned and  
finished with a flange of steel bolted thereon,  
to prevent the tires when shrunk on from  
slipping. These car-wheel centers are not  
dutiable as "forgings of iron or steel," in  
view of the further processes of manufacture  
which they have undergone, nor as "steel-  
tired wheels for railway purposes," for the  
reason that they are not fitted with steel  
tires. The Department decides that they  
are properly dutiable at the rate of 45 per  
cent, ad valorem, as "manufactures."  
\* \* \* composed wholly or in part of  
iron \* \* \* or any other metal, and  
whether partly or wholly manufactured,"  
as claimed by the appellant.

**DRAWBACKS ON TACKS AND SHOE NAILS.**

The Treasury Department decides that  
on the exportation of "tacks" and "shoe  
nails" manufactured wholly from imported  
bar steel, a drawback will be allowed equal  
in amount to the duty paid on the imported  
material used in the manufacture, less the  
legal retention of 10 per cent. The quanti-  
ties of the material so used will be de-  
termined for the tacks by adding to the net  
weight of the exported articles 14 per cent  
of such weight, and for the shoe nails by  
adding to the exported net weight 9 per  
cent thereof.

**SCRAP IRON AND STEEL.**

The Secretary has promulgated the in-  
structions of the Department based upon the  
decision of the Supreme Court of the

United States involving the question under  
the old tariff acts as to the rate of duty on  
punchings and clippings of wrought-iron  
boiler plates and wrought sheet iron left  
after the process of the manufacture of the  
boiler plates into boilers was completed and  
on the ends of bridge rods and beams of  
wrought iron cut off to bring the rods and  
beams to the required lengths, the ends  
being only fit for remanufacture. The  
importers claimed \$8 a ton duty "as  
wrought scrap iron of every description."  
The collector decided that it was excluded  
from this classification by the provision in  
said paragraph that "nothing shall be deemed  
scrap iron except waste or refuse iron  
that has been in actual use, and is fit  
only to be remanufactured," because it  
had not been "in actual use." The  
only actual use to which the iron had  
been subjected was in the making of boilers  
from the plates out of which it had been cut  
in the process of manufacture, and in the  
building of bridges from the rods and beams  
that had been cut to adapt them to their  
places. The Court held that the iron in  
question had been "in actual use" within  
the meaning of the statute; that, although  
the pieces had never been used in the boilers  
or in the bridges, they had been used in  
making those structures, and thus had  
accomplished the purpose for which they  
were originally manufactured, and that  
this use has been actual, not colorable only.  
The Secretary therefore directed that the  
rule laid down by the Court be applied to  
all future importations. Steel scrap ends,  
which consist of the ends of railroad iron  
cut off in the process of manufacturing the  
rails, also come within the scope of said de-  
cision, if imported after the act of March 3,  
1883, went into effect, and are entitled to  
entry as "scrap steel."

**DUTY ON IRREGULAR FORMS OF STEEL.**

Certain flat pieces of steel of irregular  
form, very long and heavy, each measuring  
from 32 to 37 1/2 feet in length, from 7 to 8  
inches in width, and from 2 to 2 1/2 inches  
in thickness, are held to be dutiable according  
to value per pound.

**PUNCHINGS, CLIPPINGS, ETC., DUTABLE AS SCRAP IRON.**

The Acting Secretary of the Treasury has  
promulgated the following important in-  
structions concerning the duty on punch-  
ings, clippings of plates, &c.: Under the  
decision of the United States Supreme Court  
in the case of *Schlesinger et al.* against the  
United States, punchings and clippings of  
wrought-iron boiler plates and wrought  
sheet iron left after the process of the man-  
ufacture of the boiler plates into boilers was  
completed and the ends of bridge rods and  
beams of wrought iron cut off to bring the  
rods and beams to the required lengths and  
to remove imperfections, were held to be  
scrap iron in use, and dutiable as such,  
under the provisions of the old tariff for  
scrap iron, which prescribed a certain rate  
of duty for "wrought scrap iron of every  
description." \* \* \* But nothing shall be  
deemed scrap iron except waste or refuse  
iron that has been in actual use and is fit  
only to be remanufactured." The principle  
enunciated in this decision applies, under  
the existing tariff, to all punchings and  
clippings of new iron and new steel, ends of  
railway bars of iron or steel, usually called  
"crop ends," and all new scrap iron and  
steel fit only to be remanufactured, and con-  
sequently such merchandise should be sub-  
jected to a duty of 10 per cent per pound,  
under the provisions of the act of March 3,  
1883, as scrap iron and scrap steel.

**OTHER DECISIONS.**

Certain glass and metal instruments, prin-  
cipally for commercial or industrial pur-  
poses, were held to be dutiable at the rate  
of 45 per cent, ad valorem, under the pro-  
visions in the existing tariff for manufac-  
tures of glass and metal, respectively, inas-  
much as they are not considered as coming  
within the scope of the provision for "phil-  
osophical apparatus and instruments."

Damage to tin cans containing fruits,  
which damage, as alleged, has occurred  
on the voyage of importation, cannot be  
allowed, inasmuch as, under the rule, al-  
lowances for damage cannot be made ex-  
cept where the goods themselves have  
sustained actual, substantial injury. The  
damage to packages of this character is  
what is termed "commercial damage," and  
allowance therefor is excluded under Arti-  
cle 557 e of the Regulations.

The assessment of the pipe lines owned by  
the several natural gas companies in Pitts-  
burgh has been completed and is as fol-  
lows: *Philadelphia Company*, \$1,038,761;  
*Charters Company*, \$1,078,811; *Peoples'*  
*Company*, \$146,997; *Manufacturers' Com-*  
*pany*, \$56,640; *Pennsylvania Company*,  
\$19,699; *Washington Company*, \$19,745.  
The taxes on this assessment will aggregate  
\$62,162 72 for the present year. The Phila-  
delphia Company has pipes in all of the 36  
wards in the city. The total pipe in the  
city is nearly 200 miles, on which the valua-  
tion aggregates \$1,579,126.

A curious accident happened on a road  
running out of Cleveland that led to con-  
siderable delay with a through passenger  
train. The engine that was running the  
train had just been through the shop getting  
a thorough repair, and she was set up very  
high on the springs, and a new stack was  
put on which was also rather aspring. The  
fact that the engine held her head too high  
was not discovered when she was attached  
to a passenger train, and accordingly she  
started out bravely till a low bridge was  
reached, when the stack was knocked off  
entirely.

Evidence as to age always requires careful  
examination. The *Lumber Trade Journal*  
says that many surveyors and lawyers know  
that the concentric rings shown by trees are  
not to be taken as evidence of the lapse of  
time, and it gives the following as the result  
of an examination of pieces of wood from  
trees the age of which was known. Pig  
hickory 11 years old showed 16 rings;  
green ash, 8 years, 11 rings; Ky. cotton-  
wood, 10 years, 14 rings; Burr oak, 10 years,  
24 rings; chestnut, 4 years, 7 rings; peach,  
8 years, 9 rings; chestnut oak, 24 years,  
18 rings.



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FOR  
HARD COAL  
OR  
COKE.

COMPLETE WITH  
Revolving Shaker Grates  
AND  
Blast Gate.

MADE IN  
Ten Sizes  
AND  
Styles  
FOR ALL CLASSES OF WORK.

**BUFFALO FORGE COMPANY,**  
BUFFALO, N. Y.



**PENFIELD BLOCK CO.,** Lockport, N. Y.  
Manufacturers of the West Patent Lock and Metal Plug Wooden Faucets.

Made of the best material. Compressed Leather Liner. Composition Spigots (Non-Corrosive).  
During years of practical use the West Lock Faucet has received universal commendation from the  
trade as being the best Lock Faucet in the market.  
All Faucets packed in barrels unless otherwise ordered. When packed in boxes we charge extra to  
cover cost of boxes. WRITE FOR PRICE LIST AND DISCOUNTS.  
HENRY B. NEWHALL CO., Agents, 105 Chambers St., New York.

**HERO FRUIT JAR COMPANY,**  
— MANUFACTURERS OF —  
Chace's Patent Machine, Sewing Machine, Paragon, Automatic,  
Engineers', Dripping and Bicycle



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Oil Spouts, Sprinkler Heads, Engineers' Sets, Can, Coffee and Bottle,  
Flask and Shipping Can Screws, and all other Regular and  
Special Goods in *Spun or Stamped Ware*.

All kinds of Sheet and White Metal Goods made to order.  
We have the largest and best facilities for furnishing  
the best quality of work and promptly.

Correspondence solicited. Write for Catalogue.

Office and Factories: **GAUL and ADAMS STS., PHILADELPHIA.**

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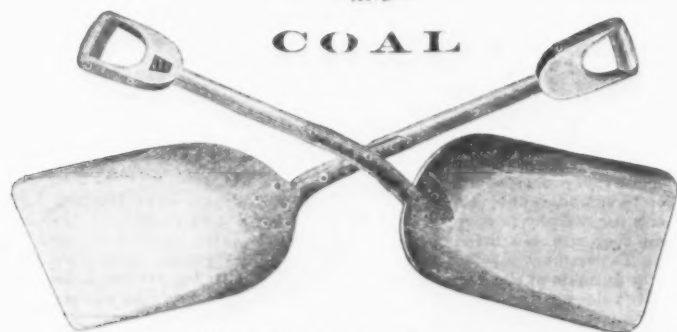
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MAKE A SPECIALTY OF

Railroad, Contractors' and Miners' Shovels,

—AND—

COAL



Also call special attention to their

NEW PATTERN SMOOTH BACK COAL BARGE SCOOP.



Prices Quoted on Application.

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YOU ARE NOT SATISFIED  
With your Window Fastener, Try  
Leiche's Burglar-  
Proof Sash Lock  
& Automatic Win-  
dow Holder and  
YOU WILL  
BE! Made of  
Malleable Iron  
and can-  
not be  
broken.  
Equal in  
all re-  
spects  
to cords  
and  
weights  
and at  
one-tenth the cost. Can be applied with a screw  
driver by any handy person.

STATE AGENTS WANTED.

Manufactured by

J. R. CLANCY, Syracuse, N. Y.



P. F. BURKE,

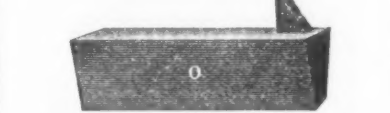
Successor to C. F. Dewick & Co.,

Manufacturer of

PATENT STEEL

Toe Calks,

360 Dorchester Avenue, Boston, Mass.



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**SOLID  
STEEL  
BLADES.**



Adjustable  
HANDLES.

Pat. Sept. 8, 1885

**WHEELER, MADDEN & CLEMSON MFG. CO.,**  
Middletown, N. Y.

**VIRGINIA NAIL AND IRON WORKS COMPANY,**  
LYNCHBURGH VIRGINIA.

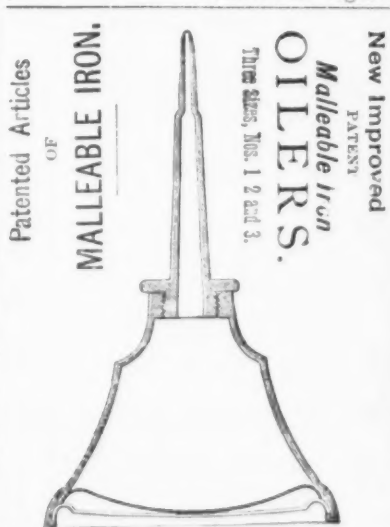
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IRON AND STEEL IMPORT-  
ERS AND  
COMMISSION MERCHANTS.

**CHAS. G. ECKSTEIN & CO.,**  
32 Liberty Street, New York.

STEEL RAILS TIRES AND  
AXLES. WROUGHT IRON  
WHEEL CENTERS BEAMS  
&c.

American Agents of THE JOHN COCKERILL CO., Sclaing Belgium.



Patented Articles  
OF  
MALLEABLE IRON.

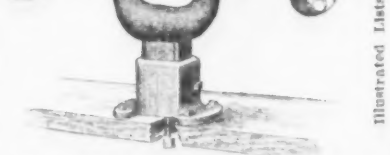
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Hall. Iron Hand Lamps  
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Strongest in the market.

For Sale by all the Principal Hardware Dealers.  
SEND FOR PRICE LIST.

MALLEABLE IRON CASTINGS  
of superior quality, and Hardware Specialties  
in Malleable Iron, made to order.

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Adjustable Buffers and Grinders,  
SPINNING LATHES, CIRCULAR SAWS, &c.

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A. MUGFORD, Hartford, Conn.

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Office and Salesroom at  
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Manufacture and Depot at  
**UNION PORCELAIN WORKS,**  
GREENPOINT, N. Y.

Impure Water is Poison. Best  
Filter ever Invented.

Price \$3.75 to \$41.25 each,  
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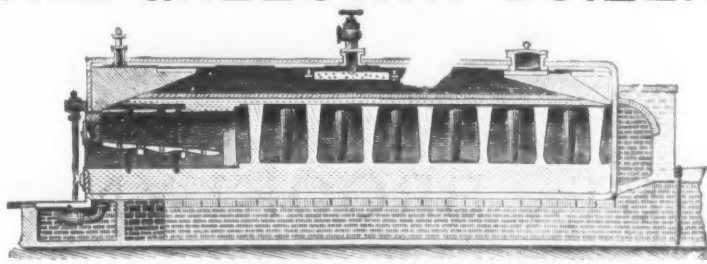
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## English Letter.

(From Our Regular Correspondent.)

LONDON, March 31, 1887.

### THE SITUATION

remains unchanged in almost all its principal aspects, and is eminently quiet at the moment. For several reasons the markets have become very dull, and there is a general giving way of values in respect of almost all kinds of iron. One of the principal causes of the retrogression is the remarkable severity of the weather for this season of the year and for this country. Every night we have from 10° to 20° of frost, while snow has fallen to a greater or less extent every day for over a week. On March 12 there was a heavy snow storm in the North of England, and on March 15 we had from 8 to 12 inches of it all over the south and west of England. These, for us, are at any time heavy snows, and coming now, when preparations for the spring and summer trade ought to be in full swing, they are confusing to buyers and decidedly hamper business, even though they have had no effect upon our railways or other means of inter-communication. This severe weather also hinders the reopening of the Northern navigations. The Baltic and some of the Northern ports were expected to be open by this time, instead of which we have telegrams from various ports announcing hard frosts and the formation of new ice in the harbors, bays, &c. Another and a prime cause of our dullness is the release which appears to have taken place in the United States. To most of our iron men this remarkable change is very puzzling, and they generally attribute it to internal causes, the weight and incidence of which do not appear to be clearly ascertained or published. It is hoped, of course, that the release may prove to be temporary only, and there is a disposition to believe that such is the case. Meantime it is more than suspected that many of the second holders on this side are pressing iron and warrants for sale on account of American speculators who wish either to keep our market down to suit their operations with yourselves, or are anxious to get rid of iron which they had been holding on this side in readiness for shipment in case your market should get well on the boom. Perhaps the most favorable feature of the outlook is the calm which seems to be stealing over European politics; matters appear to be much more pacific and hopeful. On the whole, the indications seem to be in favor of a general improvement all along the line directly the spring sets in, such change being certain to be the more emphasized should your market regain its recent elasticity and activity.

Some time ago I told your readers that there was every prospect of the reconstruction of the rail-makers' association, or, at all events, a great likelihood of the formation of a British rail-makers' association. I am now informed that the chances of either of these projects being carried through are rather poor. One or two concerns have proved unwilling to join, consequently the plans are in abeyance, although two of the leading houses are reported to be as anxious to have the new "ring" as they were to get out of the old one.

Little more has transpired as to the establishment of the Moss Bay Company (and perhaps another British company) on your or the Canadian Pacific Coast, but I think we shall hear shortly that Puget Sound and Texada Island will be selected as the seats of these enterprises. Efforts will probably be made to obtain the advantages of the tariffs of both countries, perhaps by straddling the border line at a suitable place. It is unnecessary for me to "send coals to Newcastle," of course, by pointing out the many advantages of Puget Sound, the coast of British Columbia, but I may venture to say that these advantages have recently been very fully prospected by competent men on behalf of English and San Francisco capitalists, who are men both of means and great experience.

The ironworkers of this country are drumming up their organizations in view of the conference they are about to hold either at Birmingham or Manchester with a view of formulating a demand for a general advance in the wages or rates of payment of puddlers, ball furnacemen, shinglers, millmen, forgers and all other classes engaged in producing crude and rolled iron.

### THE IRON MARKET

has been subject to fluctuations during the week, with a tendency toward dullness and inactivity. The severity of the weather has no doubt contributed somewhat to the present quietude, but the chief reason for its existence is found in the reluctance of buyers to place their orders. Makers' brands are only a little lower than they were a week or two ago, and buyers cannot readily secure their own terms from the makers. Moreover, shipments have remained favorable in almost every respect, and home requirements are fairly good. Glasgow warrants closed at 43 3/4. In Cleveland there has been practically no change, about 35 3/4 at 35 1/2 still ruling for No. 3, G. M. B. On the West Coast the condition is likewise unchanged, about 45 1/2 ruling for hematite warrants throughout the week. In Staffordshire prices have slightly receded, but sellers show a determined front and make it difficult for buyers to obtain concessions. Turning to the manufactured departments, a similar state of things is reported. The briskness of a few weeks ago has largely disappeared, black sheets for export being for the time the only department at all busy. Galvanized sheets are easier, especially the lower grades, and the lots purchased are comparatively small. Bars, rods, hoops, &c., are also flat, transactions being of a from hand-to-mouth, in consequence of the uncertainty of the immediate future. In old iron a fair business has been done, but at rates lately quoted. These are as under: Old D. H. iron rail, 62 1/2; heavy wrought iron scrap, 50/ at 52 1/2; iron fish plates, 70/; leaf-spring steel, 57 1/2 at 60/; flange rails, 61 1/2 at 62 1/2—all as quoted by F. Pitts & Company, London, and all f.o.b. London or other good

British port. Freight for pig iron by ordinary steamer from Glasgow to N. Y. remains steady at from 6/6 to 7/6 per ton. Nearly all the steel works are reported well occupied, and the outlook is encouraging. The lighter departments are also fairly employed. Steel sleepers are engaging more attention, and it is rumored that some of the English railways are about to take them up more extensively. Meantime prices are showing an improvement, £5, 12/6 or about that sum having been obtained this week for a small order which has gone to South Wales. Business in blooms for the United States is about the same as it was last week, prices ranging from £3, 17/6 to £4. Basic billets, f.o.b. Middlesbrough are quoted for 4 inches x 4 inches at from £4, 2/6 to £4, 5/6, and f.o.b. Glasgow, £4, 7/6; Siemens Martin billets, f.o.b. Glasgow are about £4, 12/6 per ton. Steel rails are not in such request as they were a week or two ago, the principal inquiry being one of about 12,000 tons for the East Indian Railway Company. American inquiries are flat. As to the suggested association of railmakers, negotiations appear to have been dropped.

### SCOTCH PIG IRON

is quiet and irregular, steady bear sales and not very favorable statistics having kept down prices at a level which compares badly with the figures of January. There are now 72 furnaces—51 on ordinary pig—at work, as compared with 95 a year ago. In Connal's stores there are 851,692 tons—an addition of 2586 tons last week—against 704,370 tons this date last year. Warrants are 43 3/4; they were 39 1/2 last March, this date. The shipments last week were 4681 tons better, and are 12,410 tons ahead this year. Importations of Middlesbrough pig into Scotland are 2821 tons better this year so far.

### MIDDLESBROUGH PIG IRON

is very quiet, and there is not a great deal of business doing, although some negotiations are in hand for large parcels for shipment to the Continent in the spring.

### HEMATITE PIG IRON

is also quiet, and warrants for it are changing hands at very low figures. For mixed numbers about 45 1/2 at 47 1/2 may be quoted. There are now 52 furnaces at work, against 45 a year ago. In stores only stocks are 166,939 tons—an increase of 34,846 tons this year. Pig-iron shipments have decreased by 13,342 tons, while rail shipments have increased by 52,103 tons.

A recent issue of the Cleveland Leader contains the following editorial statement: "Numerous establishments have been prevented from locating here because of the agitation constantly fomented by certain organs and cliques. Local capitalists have been restrained from investing money in productive enterprises by the spirit of unrest kept alive for political and other selfish purposes. Only a few months ago the proprietors of a large car manufacturing came to Cleveland with the view to locating here. Several capitalists in this city were ready to invest heavily in it, and one railway manager tendered an order for the first 2000 cars made. But just at that moment two or three strikes occurred; the demagogues hoisted themselves into prominence anew, and certain organs outdid themselves in the effort to stir up a general strife, if not violent outbreak. That killed the new enterprise effectually, so far as Cleveland is concerned. Timid capital was frightened back into bonds and vaults, and the city failed to secure an establishment that would have paid from \$500,000 to \$1,000,000 annually in wages. That is only one of several instances of which we have personal and positive information, and doubtless there were others of which we did not know."

The Muncie, Indiana, Board of Trade have issued a circular containing the following statement concerning its supply of natural gas: "We have five wells, flowing several million feet of gas daily, and others being drilled. Two of our wells are at least two miles distant from each other, the others located at points between, which demonstrates the fact that the supply is not confined to any limited district, but universal. The gauge indicates 325 pounds pressure almost instantly when attached to our strongest wells. Gas is reached here at an average depth of 900 feet, and wells are drilled with ease and rapidity. Our first well has now been flowing about six months. It and all others have increased constantly in force and quantity, notwithstanding the fact that some are very near together. Three to five hundred stoves are now being supplied in the city. The Muncie Bagging Company, two boilers, 150 horse-power engine; Boyce's Electric Light Station, two boilers, 100 horse-power; Wysox & Hibbits, Flouring Mill, two boilers, 125 horse-power; J. H. Smith & Co., Bending Works, three boilers, 125 horse-power; J. Truitt, Saw Mill; Wysox, Haines & Co., F. Under and Machinists; Indiana Bridge Company; J. E. McKendry & Co., Slack Barrel Heading, and many other factories are now being supplied, while the flow at the numerous escape pipes is apparently not diminished."

According to Engineering, it has been observed that the molten iron seen during a casting of several tons is transparent. It was possible to see bodies through the stream of metal, they taking, however, a yellow tinge. The observation is one of much interest, and perhaps others engaged in the iron industry will be able to confirm it, since it is hardly likely that the phenomenon has not been witnessed before.

The Mitchell Iron Mine, at Negunee, Mich., has been sold by Messrs. Avery & Ames, of Milwaukee, to the Luckawanna Iron and Coal Company, of Scranton, Pa., on private terms. The consideration involved is reported to have been very large, as the mine is a valuable deposit of Bessemer ore.

The Climax Reaper Works, of Corry, N. Y., are using petroleum as a fuel for boilers, using the method of G. Dockstader, of Randolph, N. Y.

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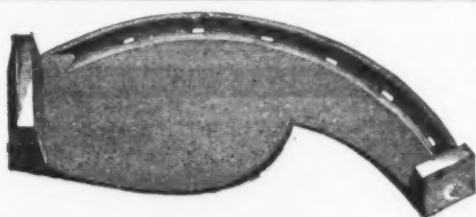
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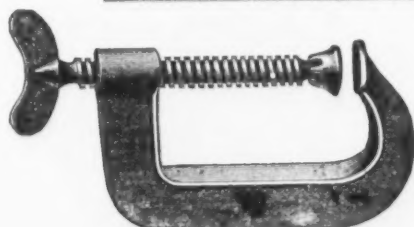
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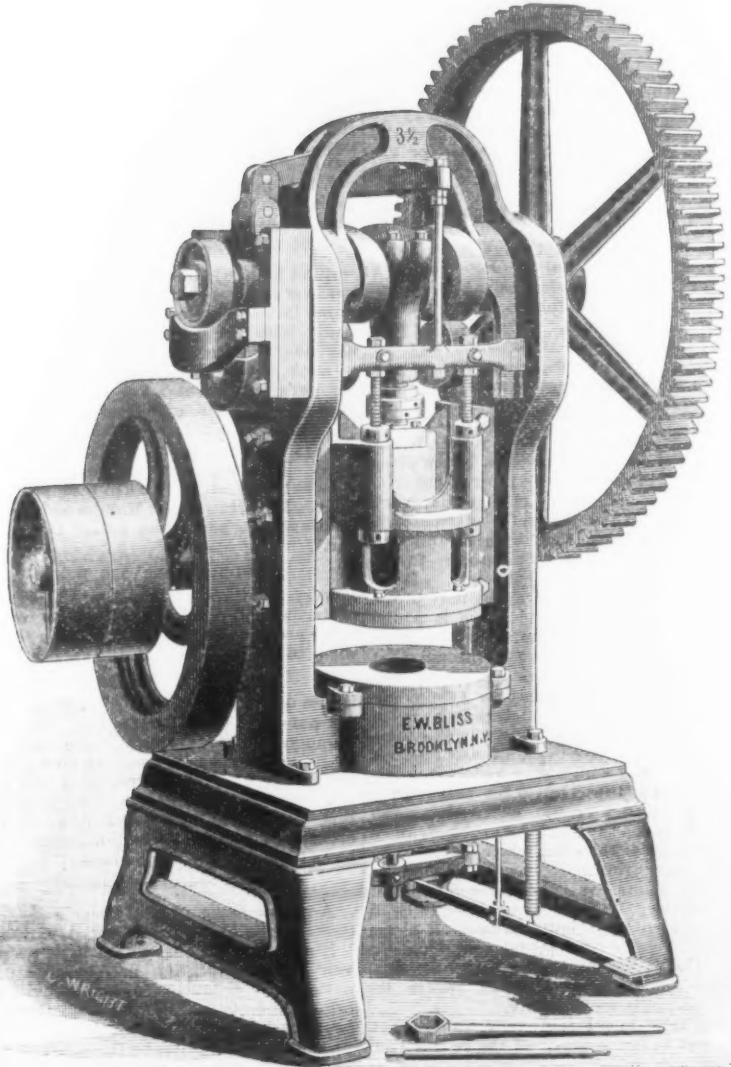
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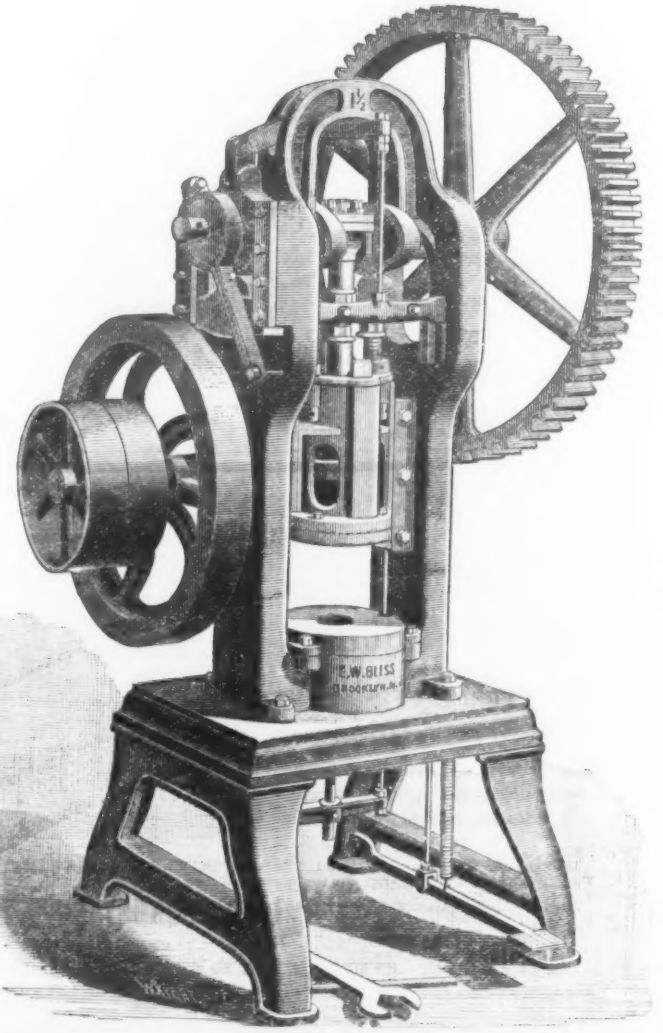
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*Pattern Problems.*

161

and Technicalities; (2) Drawing Tools and Materials; (3) Geometrical Problems; (4) The Art and Science of Pattern Cutting; and (5) Pattern Problems. These titles sufficiently indicate the subject matter of the several parts.

The specimen page here shown is from the last division of the book, entitled "Pattern Problems," and which embraces more than one-half of the entire work. It shows the manner in which practical questions are treated. The list of problems demonstrated is very extensive, and embraces almost everything of common occurrence in the sheet-metal trades, with enough of the exceptional to show methods adapted to special requirements. This chapter, in short, is a ready reference book for all who have pattern cutting to do. Each demonstration is complete in itself. A carefully prepared index facilitates reference. The work has been prepared for sheet-metal workers in general, and not for any one class in particular. The tinner will find in it what he requires, without the necessity of studying the cornice problems. The cornice maker will find in it everything, from a simple miter to the most complex problems, so arranged as to meet his requirements without the necessity of going through portions in which he is not interested. The general student will find the entire subject presented in such a manner as will facilitate systematic study. The rapidity with which each edition has been exhausted, and the universally favorable

G II R, of Fig. 426, is presented one of the sets of conditions which necessitate a change of profile, in either the horizontal or raking molding, in order to accomplish a miter joint at the point indicated by I II in the plan. In other words, the conditions are such that with a given profile, as shown by A' in the raking molding, the horizontal molding forming the return will require to be modified, as shown by the profile A'', in order to form a miter upon the line I II in the plan; or, if A' is established, A'' will have to be constructed to correspond with A'. The reason for this is quite obvious. The distance across the raking molding at right angles to its lines is greater than the corresponding distance across the return molding at right angles to its lines; therefore the projection in the cornice, as shown by the profile A', must be distributed through a smaller space than is shown in the profile A''. In this problem we assume that the pitch of the raking cornice B C is established and that the profile A is given, and from these parts it is required to develop the modified profile. We have the choice of placing the normal profile in the horizontal return and making the raking profile correspond with it, or of placing the normal profile in the raking molding and making the profile of the horizontal molding agree with it. Although the principle upon which these operations is performed is identical in both, the demonstration will be made clearer if each is fully illustrated independent of the other. In this problem and the following one, therefore, we show the several steps necessary to take in modifying the profile, and in cutting the several patterns required to form the structure indicated by the elevation and plan. First we will assume that the normal profile occurs in the raking cornice, and that the horizontal profile is to be modified to suit it. We then proceed as follows: Draw a representation of the normal profile in the raking cornice, as shown by A', placing it to correspond to the lines of the cornice, as shown. Draw another profile corresponding to it in all parts, directly above or

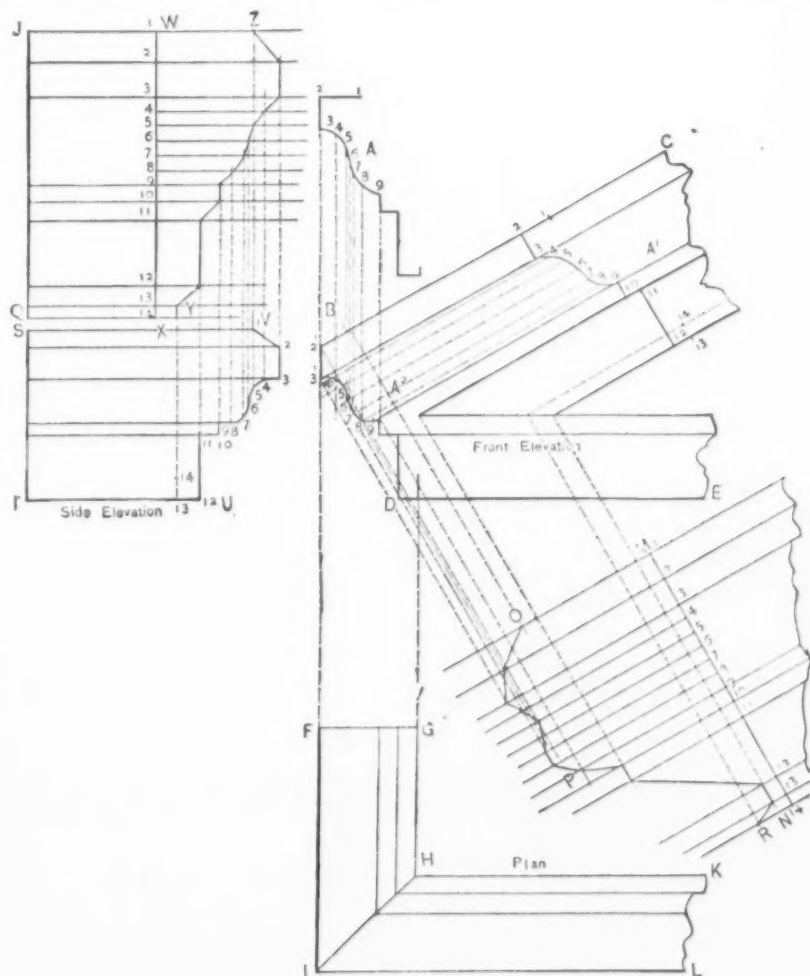


Fig. 426.—To Ascertain the Profile of a Horizontal Molding Adapted to Miter with a Given Inclined Molding at Right Angles in Plan, and the Several Miter Patterns Involved.

below the foot of the raking cornice, in line with the face of the new profile to be constructed, placing this profile A so that it shall correspond with the lines of the horizontal cornice. Divide the profiles A and A' into the same number of parts, and through the points thus obtained draw lines, those from A' being parallel to the lines of the raking cornice, and those from A intersecting them vertically. Through these points of intersection trace a line, which gives the modified profile, as shown by A''. Then A'' is the profile of the horizontal return, indicated by G II I F in the plan. It is also the elevation of the miter line I II of the plan for the several patterns involved. We therefore proceed as follows: At any convenient point at right angles to the lines of the raking cornice lay off the stretchout M N of the profile A', through the points in which draw measuring lines in the usual manner. Place the T-square at right angles to the lines of the raking cornice, and,

comments it has called forth, prove that it fully meets the want it was intended to supply.

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## THE WEEK.

More definite announcements are made respecting the American Exhibition in London, which will consist exclusively of the products of the United States. The board of directors is made up of well-known Americans, with whom are associated eight Englishmen, constituting the English executive committee in London. The executive committee in the United States consists of Col. Henry S. Russell, of Boston, Col. E. A. Burk, of New York, John G. Speed, R. M. Smith and Burnet Landreth. The industrial department of the exhibition will comprise samples of crude and manufactured products from all parts of the United States, and it is stated that 90 per cent. of the entire floor area of the buildings has already been taken up by applicants for space. One-third of the space in the buildings will be devoted to machinery in motion, which will be driven by an American engine of 350 horse-power, built by Jerome Wheelock, of Worcester, Mass., and fed by steam from a 700 horse-power boiler, also of American make.

The stove molders in St. Louis threaten a strike which they say will soon involve all the leading manufacturers in the United States. On the 2d inst. the Executive Committee of the Founders' National Defense Association met at the office of the Bridge & Beach Stove Company, and resolved that the patterns of the Bridge & Beach Mfg. Company be distributed among the members of the Fourth District National Defense Association, and work with the patterns begun at once. The molders have now increased their demands to an advance of 15 per cent. on the present scale or nothing. The three great foundries in St. Louis are still closed.

At Sault Ste. Marie, Michigan, where two great railroad systems are to unite at the international boundary, speculators have become wild in the belief that an important business center is to be established at that point.

The water routes from the West to the seaboard have acquired a new importance through the operation of the Interstate Commerce law touching "long haul" transportation, and the New York State Legislature does well in favoring an appropriation for the maintenance of the Erie Canal as a free competitor for freight. A commercial contemporary well says: "If protected by the State in its right to live, it will forever successfully defy all attempts of the railroads to overtax the traffic in grain and the other staples which seek the Erie Canal during the summer."

The Pioneer Iron Works, of Marcus Hook, Pa., have received a contract to build a 100-foot steel steamer, to be built in sections and shipped to Lake Superior, N. H.

It is predicted that the Marquette County iron mines in Michigan will send to market this year more iron ore than ever before, as immense piles are awaiting shipment and ores are usually forwarded freely on a rising market. The Lake Superior Mine, according to present estimates, will ship 300,000 tons, against 267,622 tons last year; the Lake Angeline Mine at least 150,000 tons; the Jackson, 100,000 tons or upward; the Champion, nearly 200,000 tons; the Cleveland its regular product of about 200,000 tons; the Republic, 200,000 tons. Altogether Marquette County will ship 2,000,000 tons of ore in 1887—more than the total ore production of the entire Lake Superior district in 1881.

The Dominion Government has decided to reduce the rate of tolls on all through freight going east through the St. Lawrence canals from 20 cents to 2 cents per ton, but this reduction does not apply to freight passing through the Welland Canal in American vessels to ports in the United States. It does not yet appear that this discrimination is admissible under the existing treaty.

Mr. Manning's resignation took effect 1st inst., and Chas. S. Fairchild at once became the head of the Treasury. Mr. Maynard, of New York, taking Mr. Fairchild's place as Assistant Treasurer. Mr. Fairchild is still a young man in robust health, and is already familiar with the work of his new office. Mr. Maynard, formerly Second Comptroller of the Treasury, is an able lawyer and good business man.

The Alaska Commercial Company, through their agent in Washington, demand more efficient protection for the seal fisheries, which it says are in danger of extermination. The contract between the Government and the Alaska Commercial Company was made on Aug. 21, 1870, for a period of 20 years, and it has but little over three years more to run. The company are allowed to take 100,000 sealskins a year, and pay an annual rental for St. Paul and St. George Islands of \$55,000 and a tax of \$2.62½ on each skin taken and shipped from the islands. The United States paid Russia for Alaska \$7,200,000, and the company claim that the books of the Treasury Department will show that more than \$5,000,000 have been paid to the Government by the Commercial Company since 1870, and that more than \$2,000,000 of customs duties on dressed sealskins have been collected, and that the sealing industry alone has repaid to the United States the cost of the Alaska purchase. The company are not content that the killing of seals outside one marine league from the shores of St. Paul and St. George Islands shall be prohibited,

but wish the entire eastern half of Behrings Sea protected from the incursion of sealing schooners.

The receiver of the Wabash system wants 4000 tons of steel rails, which he expects to get for \$80,000 by applying the proceeds of a sale of the old rails now in use.

The Duke of Devonshire, now verging on 80, has resigned the chairmanship of the Barrow Hematite Steel Company and Barrow Shipbuilding Company. He is succeeded in these positions by his son, the Marquis of Hartington.

Secretary Whitney has approved the report of the board appointed to select the sites for the two new dry docks authorized by the last Congress. The docks will be located at the New York and Norfolk navy yards, and will be built by contract on the general plan of the Simpson dry docks. They will be constructed of timber, and the dimensions will be about as follows: Length, 485 feet; width at the top, 125 feet, and width at the bottom, 60 feet. The amount of money available for their construction is \$1,100,000. The New York dock will cost more than the dock at Norfolk, owing to the difficulty of obtaining a good foundation.

English cutlers, with all their skill, are unable to turn out a sword blade which can be compared with the wonderful swords of Japan. For fineness of temper and keenness of edge they are unequalled in the modern world, and can scarcely be matched by the blades formerly forged in Damascus and Toledo. A common feat for a Japanese soldier is to cut a pig in two at a single blow, and bars of lead, and even of iron, have been divided by these weapons with a notch or imperfection being visible on the blade. The fact is, the Japanese understand the tempering of sword blades better than any other people.

It is claimed that the third largest stove works in the United States is in Leavenworth, Kan., where the "Great Western" establishment turns out a stove every five minutes. The Union Stove Works, in Leavenworth, turn out 10,000 stoves annually, besides architectural ironwork and galvanized iron bake ovens, which are shipped to Europe, Canada and the Sandwich Islands.

So long as cholera ravages Corea, it is useless to speak of new commercial projects connected with that country. Consul Goodwin says: "The usual independent connections between Yokohama and Corea ports continue to be available, and parties in the United States having goods to ship to Corea may, as heretofore, have them billed to Yokohama by American or other lines and then re-billed to Corea."

Mexican papers are discussing the possible advantages of a monetary union between that country and the United States. "Certainly," says the *Financier*, "if the two Governments would agree to strike a silver dollar interchangeable in both countries for merchandise, a great impetus would be given to international commerce. A monetary union is not, perhaps, impracticable, and has, in fact, been suggested by distinguished members of the Senate and House of Representatives at Washington. Any one can see at a glance that, when a Mexican dollar can purchase as much as a gold dollar in New York, Boston, Chicago or St. Louis, imports from the United States would vastly increase."

Findlay, Ohio, is enjoying extraordinary prosperity as a result of natural gas discoveries. The gas wells are owned by the city, and the cost of fuel to consumers is nominal, which manufacturers are quick to recognize. The Briggs Edge Tool Works are among the latest additions, besides three glass factories, and it is stated that three rolling mills have decided to locate there, also a large steel works from Jackson, Mich., the Gibbs Plow Works and several other establishments, which are expected to add 2500 workmen to the population before another year. Work on one of the new rolling mills has already commenced.

The first month of the enforced idleness of the convicts in Sing Sing, which expired 31st ult., shows an excess of expenditures over earnings amounting to \$7797.33, which will have to be met by a draft on the State Treasury. During the previous month these same prisons yielded a clear profit of \$2000.

Newark, N. J., while ranking 15th in point of population among the cities of the United States, is 11th in the value of manufactured articles produced. There are within its limits nearly 1400 manufacturing establishments, employing some 42,000 persons, whose annual output was, according to the census report of 1880, about \$70,000,000. Judging from these figures, the enormous total of \$85,000,000 for the present time is a fair estimate. The figures below represent a few of the leading industries:

Leather, mostly patent and enameled	\$10,440,992
Gold, silver and metal refining	8,794,930
Jewelry	4,932,837
Malt and malt liquors	4,508,707
Hats and caps	2,912,894
Cut in, woolen and silk goods	2,212,250
Trunks, bags and frames	2,138,023
Clothing—men's	2,035,108
Wholesale boots and shoes	1,886,504
Celluloid	1,251,540

The statistics of farm mortgages obtained by the Department of Agriculture are very indefinite, the State agents being able to report with little confidence in regard to the increase or decrease of mortgage obligations within their respective spheres

of observation. The report as to New York is much more accurate in its form than any other, and this represents that "30 per cent. of the farms in the State are mortgaged, ranging from 6 per cent. of their value to 100 per cent. Average, 66½ per cent. of estimated value." In Pennsylvania, only 15 per cent. of the farms being mortgaged, the proportion of debt to value would be only about one-tenth. It seems improbable that so wide a variation in the condition of farmers in two great adjoining States, both alike prosperous, actually exists.

Chas. de Lesseps, son of the engineer, has spent five weeks in an examination of the work on the Isthmus of Panama, and reports that by the beginning of 1888 two-thirds of the canal will be navigable for small vessels. He gives a favorable account of the progress of the work.

Many of the New York longshoremen are still suffering from the effects of the great strike. A good many of them are still out of work, and it is said that no one known to be a member of the Ocean Association can get work along the North River.

Another meeting of business men in this city was held last week in opposition to the Poughkeepsie bridge scheme, Orlando B. Potter, presiding.

The tower elevator for the Elevated road station, corner of Eighth avenue and 116th street, will have four lifts in constant motion. The contractors are hard at work.

Buffalo is the first New York town to go into the Interstate Railroad Commission for redress of alleged wrongs in connection with commerce passing through it. A few months ago merchants in that city sent a formal complaint to the New York Railroad Commissioners alleging discrimination by the trunk lines against them and the general interests of the city. It was referred to Commissioner O'Donnell for examination and report, the papers in the case making a pile about a foot high. Commissioner O'Donnell satisfied himself that the State Board had no jurisdiction in the case, the complaints being lodged against interstate roads. Instead of returning the papers to the complainants the New York Board sent the entire case to Washington, addressed "To the President of the Interstate Railroad Commission."

A bill before the New York Legislature to tax savings banks meets with strong opposition. There are 1,000,000 depositors in the savings banks of this State, and the total deposits amount to over \$500,000,000. In his argument against the bill, President Trimble, of the Bleeker Street Savings Bank, said: "The savings banks cannot now invest their deposits in any of the stock securities allowed by law at rates to pay over 3 per cent. interest, while the rate on bond or mortgage will not average over 4½ per cent. It is only by the possession of old investments, now fast running to maturity, that any of the savings banks are able to pay their depositors the present rates of interest, say, 3½ to 4 per cent. The rate of taxation in this city is about 2¼ per cent., and the imposition of such a tax upon the deposits and surplus of the savings banks would compel the immediate reduction of the interest dividends to 2 per cent. or less. In other words, this bill proposes what is equivalent to an income tax of over 50 per cent. on the savings of the laboring classes."

The steel ship Chicago, the largest of the Roach cruisers, is to go to the New York Navy Yard to be fitted for sea.

For two years the Navy Department has been experimenting with patented paints and compositions intended to prevent the fouling of the bottoms of vessels, but up to this time no method has been discovered equal in efficiency to the old system of sheathing.

The purchase of the Jackson Iron Mine, at Negaunee, Mich., by Messrs. Mitchell & Chisholm, is said to have been effected for \$1,300,000.

The Jersey Central Railroad have made a contract with the Clearfield Coal Company for handling their coal. This will involve the building of a new dock at Communipaw that will cost about \$500,000, the contracts for which have already been given.

In boring an artesian well at Galveston several palmetto logs were struck 500 feet below the surface.

The Naval Board are expected to decide immediately what additional machinery and plant are necessary to enable the department to undertake the construction at the Brooklyn Navy Yard of one of the new 6000-ton vessels authorized to be built. The Bureau of Naval Intelligence has collected a mass of information that will be submitted to the board relative to the latest discoveries in naval construction, and in addition there will be placed before it the results of Naval Constructor Hichborn's close inquiries into the plant and appliances used in the largest European dockyards.

The Columbian Iron Works and Dry Dock Company, of Baltimore, have been awarded the contract for building two steel ferryboats for the Staten Island Rapid Transit Railroad Company, to be completed in seven months.

Postal cards for the Government are now sent directly from the factory at Castleton, N. Y., to supply depots in Chicago, St. Louis and Atlanta. The manufacturer,

C. C. Woolworth, of Albany, on being questioned on the subject, remarked, "We have an order now for a train load of postal cards to be sent direct to Chicago. The weight of this load will be about 125 tons, and the number about 45,000,000. We manufacture between two and three tons a day the year round. The largest order we have ever filled for one city was 4,000,000 cards, or about 12 tons of paper. It was for New York City. New York uses about 6,000,000 cards a month. Chicago comes next, with about 3,000,000 cards in the same period. There are 450,000,000 postal cards manufactured annually. Two cent postage did not lessen the use of postal cards, but checked the growth of their use for some little time. That check has been overcome, and the public are using more and more postal cards every day."

At a meeting of the joint committee of the trunk lines and General Traffic Association, held in New York last week, an agreement was unanimously reached which will abolish the payment of ticket commissions by railway companies to the agents of connecting lines for the sale of passenger tickets. This abuse, which began more than 35 years ago, has grown to such enormous proportions that it is estimated it is now costing the railways of the United States, directly and indirectly, at the rate of more than \$5,000,000 annually, and has to a great extent been the means by which ticket scalpers have been built up.

The Pennsylvania Railroad Company give out that their experiments in heating cars by steam have been so successful as to authorize a definite announcement that the car stove will be banished from their passenger trains as soon as the requisite changes can be made.

A series of new designs of embossed stamps for stamped envelopes of the 1, 2, 4 and 5 cent denominations is being prepared in the Post Office Department. The head of Franklin has been selected for the 1 cent stamp, and the heads of Washington, Jackson and Grant for the 2, 4 and 5 cent denominations respectively.

Portland, in Jay County, Ind., vies with Findlay, Ohio, in the abundance of natural gas, which it offers absolutely free to all manufacturers who care to avail themselves of a substitute for coal that costs nothing. Five wells already down are yielding enormous quantities. A correspondent of the *Fort Wayne Gazette*, says: "When those wells now in prospect and commenced are 'drilled in,' the flow is expected to be fully 15,000,000 cubic feet of gas per day, which as a fuel is equal to 420,000 tons of coal or 22,520 carloads per year."

The Alabama State authorities have discontinued the taxation of drummers, this action being recognized as in agreement with the recent decision of the Federal Supreme Court. In some other States there is a disposition to collect the tax until obstructed by the courts.

It is rather hard to say how much the new aqueduct for New York City has cost so far. The contractors have undertaken to cut it through for \$13,801,097. Five-sixths of the tunneling proper is finished. It has cost, the engineers think, about \$75 a running foot thus far, or about \$11,000,000. At this rate the total expense will fall almost within the estimate. Three millions have been set aside for lining.

President Diaz of Mexico in his annual message delivered 20 ult., gives a favorable account of the finances of the country. Treasury receipts continue to improve, and the aggregate revenue is likely to exceed that of previous years. The President speaks of the increasing confidence in the solvency of the country, and its ability to meet all its obligations.

The McMillan Child Labor bill now before the Legislature forbids the employment of children in cleaning machinery in motion, and insists on further safeguards against accidents to the little laborers. It also increases the penalty for violations of the law, and provides an adequate force of inspectors to see that its provisions are complied with. Recent investigations have shown that there are 25,000 children in New York working in factories in defiance of law.

The cable reports that the British Government have granted an annual subvention of \$85,000 to the Cunard Steamship Company for carrying the Transatlantic mails. The White Star Line agrees to hold at the disposition of the Government for purchase or hire, at the option of the Admiralty, to be exercised from time to time during the continuance of the agreement, the following vessels: *Briannic*, value £130,000; *Germanic*, £130,000; *Adriatic*, £100,000; *Celtic*, £100,000. In the event of charter by the Admiralty the rate of hire of the before-mentioned vessels was fixed at the rate of 20 per gross registered ton per month, the owner providing the crew, or at the rate of 15 per gross registered ton per month, the Admiralty finding the crew, all risks of capture and of hostilities being assumed by the Admiralty. The company have determined to build one or two vessels of high speed and of such a type and speed as will render them specially suitable for service as armed cruisers, and in accordance with the plans and specifications submitted and approved by the Admiralty. In consideration of this the Admiralty will have to pay to the company an annual subvention at the

rate of 15 per gross registered ton per annum. On the 5th of February the Admiralty accepted similar proposals made by the Cunard line in respect of the following vessels: *Etruria*, value £110,000; *Umbria*, £101,000; *Aurania*, £120,000; *Servia*, £103,000; *Gallia*, £102,000—a subvention of 15 per gross registered ton per annum to be paid to the company on account of the *Etruria*, *Umbria*, and *Aurania* during the continuance of the postal contract.

## Pig-Iron Making in the South from Charcoal Produced Under the Pierce Method.

Some eleven years ago H. M. Pierce commenced experimenting upon the question of making charcoal from retorts, with a view of utilizing all the products of the wood. In the ordinary kiln one cord of wood has yielded from 30 to 35 bushels of saw, 20 pounds to the bushel, while in the Pierce process, where carried on in a large way for supplying furnaces, the average yield of charcoal is claimed to be 50 bushels to the cord, which is worth 60 cents per bushel, \$3. Then there are obtained 3 gallons of crude wood alcohol per cord, value at 95 cents per gallon at the works, \$2.85; 150 pounds of acetate of lime per cord, 1 cent per pound at the works, \$1.50; 1000 pounds of burnable hydrocarbon, equal in value for heating purposes to the amount of \$3 of other fuel, a total of \$10.35, against about \$2.25 worth of charcoal under the old process. The first works in the South in which figures have been verified for about three years were built at Goodrich, Hickman County, Tenn. This plant has a capital stock of \$235,000, and consists of 20 charcoal kilns and a 25-ton furnace, together with a large amount of real estate, which consists mostly of mining property and timber land. The second works put up under this process were erected in 1886 at Calera, Shelby County, Ala. The capital stock of this company is \$150,000. This plant consists of 35 charcoal kilns now in operation, with a capacity of 40,000 cords of wood per annum. The charcoal produced from these ovens is at present sold to the Shelby Iron Company's furnace. The Calera Furnace and Charcoal Company propose during 1887 to erect a 50-ton charcoal furnace which will consume the charcoal of its own manufacture. J. W. Dimmick, Montgomery, is president; G. A. Lanier, Montgomery, Ala., Treasurer, and H. M. Pierce, general manager. The third to try the result of this operation was the Warner Furnace, of West Tennessee, which utilized the charcoal from the Goodrich Furnace for a number of months while that furnace was idle. The fourth was the Etna Furnace, of West Tennessee, which have their own ovens and are running upon the products. The fifth works now nearing completion are at Decatur, Ala., with 45 charcoal kilns, having an average capacity of 50 cords per kiln, or a total annual capacity of 40,000 cords. Alcohol and acetate of lime departments are connected with the plant. A 50-ton furnace is to be built during the present year at a cost of \$11,000, the size of the furnace being 12 feet high, 60 feet high, with one blowing engine having a steam cylinder 36 x 48, a blowing cylinder 48 x 84 inches, steam being furnished by Babcock and Wilcox boilers. All contracts have been let, and the construction of the furnace will be prosecuted as rapidly as possible. The president is J. M. Head, Nashville; M. A. Spurr is treasurer, R. F. Jackson, secretary, and H. M. Pierce, general manager.

The sixth plant established under this process was that of the Nashville Iron, Steel and Charcoal Company, capital stock, \$700,000, Willard Warner, president, Commercial National Bank, treasurer; J. M. Reilly, secretary. This company have two 60-ton furnaces contracted for with Gordon, Strobel & Laureau, at a cost of \$100,000. This plant will have two blowing engines to work in combination, of which the steam cylinder will be 36 x 48 inches and the air cylinder 48 x 84 inches, with Babcock and Wilcox boiler. For the manufacture of their charcoal they are erecting 80 kilns, with an annual capacity of 80,000 cords of wood. The site of this plant is on the Cumberland River, near Nashville, with railroad connections to the Louisville and Nashville and Northwestern system. The entire work is being prosecuted as fast as economical outlay of money can effect. The seventh plant under this process is located at Montgomery, Ala.; W. L. Chambers, president; capital stock, \$100,000, with one 60-ton furnace and 40 charcoal kilns for the reduction of 40,000 into charcoal and by-products. The company were organized on the 24th of March, and is being prosecuted as rapidly as possible. Licenses have also been granted to erect charcoal works at Lake Pontchartrain and Mobile, but these will have no furnaces in connection with them. Licenses have also been applied for to build works and furnaces at Selma, Ala.; Tusculooosa, Ala.; Florence, Ala., and West Point, Tenn. The valuation of the by-products in the above estimate was made at the works, and is largely under the present commercial price.

A limited company, under the title of Hampton's "Special" Ingot Steel Company, have been formed for the purpose of establishing a new steel works at Manchester, England. The company have the option of purchasing the right to a patent belonging to Mr. Thos. Hampton and Mr. John Facer for the manufacture of special steel ingots by an improved method, which consists in casting parallel ingots in groups in divided molds, in sizes varying from 3 inches square and upward, similar to the molds used in casting crucible steel ingots, and by which method it is stated the ordinary process of cogging and billeting is avoided. Mr. Thos. Hampton is to act as managing director and general manager of the proposed new company for a period of five years.

F. J. Clamer, of Philadelphia, who is connected with the Ajax Metal Company, has invented a method for coating iron and steel with lead.



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## MECHANICAL.

## A New Petroleum Burner.

In the South of Russia petroleum is now not only used for firing steam boilers, but also as a substitute for solid fuel in metallurgical and many other processes, the burners varying according to circumstances. The one we illustrate herewith was described in a recent number of *Dingler's Polytechnisches Journal*, and is intended for use with a smith's hearth. The engravings are reproduced from *Industries*. Fig. 1 shows a section through the burner proper, and Fig. 2 shows a section through the combustion chamber and the flue leading to the hearth. The crude oil, or the refuse of the refineries, is placed in a tank from 3 feet to 6 feet above the burner, and is conducted to the latter by a pipe, L, controlled

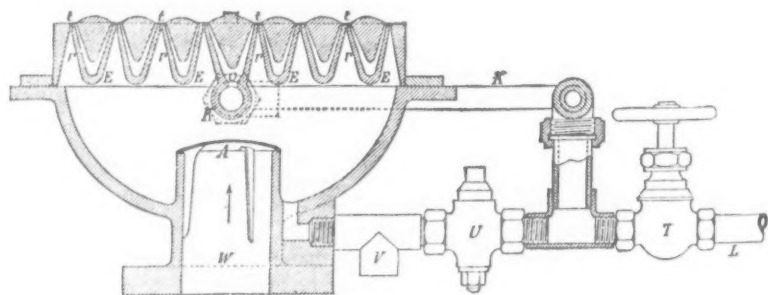


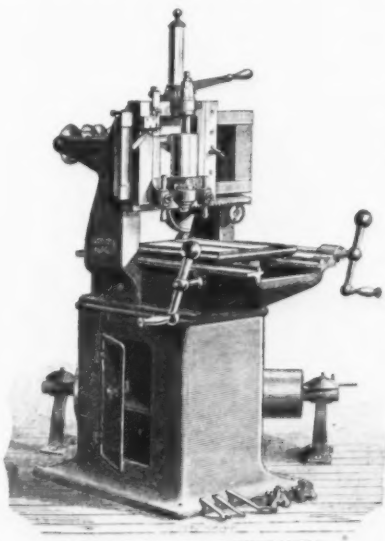
Fig. 1.—Section through Burner Proper.

## NEW PETROLEUM BURNER.

by a stop-valve, T. There is another stop-cock, U, in the same pipe, which is ordinarily closed, so that the oil is forced to ascend through the T-piece, and flow along the pipe K into the burner. The latter consists of a series of concentric annular chambers, E, communicating with the pipe K at the points of intersection by small holes, O. The oil fills these chambers, and issues at circular slots *tt*. Air under pressure is supplied through the pipe W, and passes through the intermediate spaces *rr* between the annular chambers, issuing through circular slots in close proximity to the slots above mentioned. In this way the air, in rushing out, diffuses the oil, and forms a highly inflammable mixture, which can be lighted by a torch. The stop-cock U serves to run the oil out of the apparatus through the branch V, if desired. The combustion chamber S (Fig. 2) is placed over the burner B, and is lined with fire-brick. At the top there is an opening, d, through which the torch is introduced for lighting the fire. After that is done the opening d is closed, and the flame is forced on to the hearth through the opening H. This apparatus is at present made in three sizes, and fitted with burners of 6, 8 and 10 inch diameter. The 8-inch burner requires about 33 pounds of oil per hour. The arrangement shown in Fig. 2 is extensively used in Baku and on the River Volga, and is known under the name of Westphal's burner for smithies.

## Vertical Spindle Milling Machine.

We show in the annexed cut an improved profiling machine lately brought out by E. E. Garvin & Co., 139, 141 and 143



Vertical Spindle Milling Machine, Made by E. E. Garvin &amp; Co., New York.

Centre street, New York. The table and traversing slide carrying the spindle are each moved by the ball handles shown, and the combination of the two movements makes it possible to follow any irregular outline. The operator has perfect control of the cutter, while the work is always in plain sight. The machine can be profitably employed in spotting off and facing work, die sinking, key-seating, edge milling, milling plain or T-slots, cutting cam grooves on cylinders, and also on a large variety of brass work. For facing off, this style of milling gives a perfect surface, and when the finish spots are on different levels, the spindle slide can be accurately raised or lowered by the lever, and held in position by a notch which has a screw adjustment. Allowance is made for taking up wear in the racks and gears, and the spindle slide is balanced by a spring. Stops are provided for the cross-slide and table. Changes of speed are obtained by using cones on the countershafts.

## Phosphor-Bronze Wire for Helical Springs.

At the last meeting of the Engineers' Club of Philadelphia Mr. Wilfred Lewis presented the following note on "Phosphor-Bronze Wire for Helical Springs": "About

a year ago, in designing valves for hydraulic machinery, it became necessary to use springs in the water-ways, and to guard against corrosion it was suggested that they be made of phosphor-bronze. No information, however, could be found for determining the proper size of wire and its probable extension or compression, and accordingly the writer undertook to make the following partial solution of the problem: A piece of wire 12 inches in diameter and several feet long was obtained for the special purpose mentioned, and coiled in the form of a spiral spring  $1\frac{1}{4}$  inches in diameter, from c. to c., making 52 coils. This spring was loaded gradually up to a tension of 30 pounds, but as the load was removed it became very evident that a permanent set had taken place. According to formulae recommended by D. R. Clark for helical steel springs, such a spring of steel should bear with safety a load of 20 pounds, while, ac-

with light blows of a hammer; all flat stayed surfaces are again to be proved with straight-edge, and any change of form or defects of workmanship carefully noted.

All material defects must be remedied before boiler is again put in service. In case of doubts as to necessity of repairs, superintendent of machinery must be notified, and he will give instruction for that and similar cases.

All new boilers constructed at the company's shops must be subjected to a general inspection test. The hot-water test to be applied as follows: At localities where hot-water injector is at present used for washing out, boiler must be filled with hot water by injector, and test pump used to give requisite pressure for tests. Where it is not practicable to fill boiler with hot water, boiler must be filled with water and fired up; then when temperature is sufficiently high for test purposes, fire must be drawn

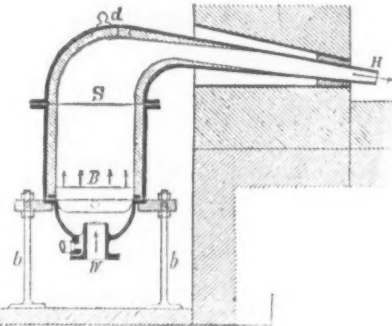


Fig. 2.—Section through Combustion Chamber and Flue.

ording to the practice of the P. R. R., it might be used for double this load, or 40 pounds. A weight of 21 pounds was then suspended from the bronze spring, so as to allow a small amount of vibration, and the length measured from day to day. In 30 hours the spring lengthened from 20  $\frac{1}{2}$  inches to 21  $\frac{1}{4}$  inches, and when suspended 200 hours its length was found to be 21  $\frac{1}{4}$  inches.

It was concluded from this that 21 pounds was too great for durability, and that probably 10 pounds was as much as could be depended upon with safety. For a given load it was found that the extension of the bronze spring would be just double the extension of a single steel spring—that is, for the same extension, the steel spring is twice as strong. The above experiment is not very conclusive, but my practice now is to allow for phosphor-bronze springs the same extension or compression as for similar steel springs, and let them carry one-half as much load.

## Pumping Engines for the Potomac Flats.

Mr. A. P. Broomell recently presented the Engineers' Club of Philadelphia a description of the large engines which are to drive the centrifugal pumps in the works for draining the Potomac Flats at Washington. This description is given in the proceedings of the club as follows: "These engines have 24 x 24 inch cylinders. They are exceptionally heavy and substantial, the bed frames alone weighing close to five tons. They will have automatic cut-offs, using my patent valves and governor. So far as I am aware this is the first instance of using automatic cut off governors of the single-valve type on connected engines. Since the shafts and runners of pumps wear out very rapidly, it is necessary to make all parts of the governor in halves so that they may be readily taken off for renewal of shafts. The requirements of this work are very severe on engine, the speed being 160 revolutions as a regular thing, and at times as much as 200 revolutions per minute. To prevent the engine working endwise at this high speed, it being attached only to the floor of the dredgers, is a pretty difficult matter. The plan I have adopted is a caging of heavy steel I-beams, firmly bolted and riveted together. We are making two pairs of these engines, as well as five smaller ones for these parties. A few of the leading sizes are: Crank-shaft of hammered steel, 13 feet long, 11 inches diameter; main-bearings, 17 inches long, babbitt lined; crank-pins 6 x 6 inches, hammered steel; piston rods, cast-steel 3  $\frac{1}{2}$  inches diameter; piston-heads have self-packing rings of cast-iron; steam-pipes, 6 inches diameter. These dredging machines are owned and operated by Messrs. Benson & McNea, of Washington."

## Locomotive Boiler Inspections.

The following items, taken from "The Rules for Inspection of Steam Boilers," issued by the Union Pacific Railway Company, indicate the scope of the system of inspection lately introduced:

## MANNER OF GENERAL INSPECTION.

After boiler has been stripped, thoroughly cleaned and flues taken out, it must be subjected to a rigid external and internal inspection, special attention being given to the following points: All internal seams and joints to be carefully examined, and fitting, grooving or corrosion of any kind noted. All stays and braces are to be examined to see that they are sound and of proper length. All stay-bolts, crown bolts and rivets, about the soundness of which there is any doubt, are to be tested by light blows of a hammer. Inspector then judges by sound which of them, if any, are broken. The fire-box is to be given close attention, and condition of crown and side sheets, together with any pitting, wasting away or corrosion noted. Corrosion is especially likely to attack iron stay-bolts where copper side sheets are used. Before lagging is put on, all stayed flat surfaces are to be proved with straight-edge, and careful record of result kept.

Boiler must be subjected to a hot water pressure which exceeds the maximum working pressure per square inch in the ratio of 1  $\frac{1}{2}$  to 1 pound.

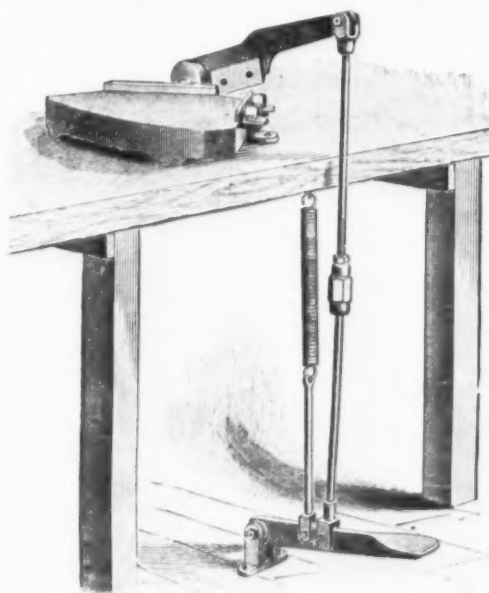
While pressure is on all exposed surfaces of the boiler must be examined and tested

and test pump used to give requisite pressure for tests. For test purposes, water should be at boiling point, or, if that is impracticable, never lower than 160°.

Master mechanics will drill holes  $\frac{1}{4}$  inch diameter by 1 inch deep from the outside in all stay-bolts. After stay-bolts are drilled any stay-bolt or bolts found leaking must be at once removed and replaced by new ones. In no case whatever are plugs to be driven in drilled stay-bolts to stop leaks or for any other purpose. In boilers with steel or iron fire-boxes and steel or iron shell, few stay-bolts break except on inside of outside sheets; consequently it is not necessary to drill stay-bolts from inside of fire-box. Inspectors and foremen of shops where stay-bolts are drilled are instructed to notice and report any sign of corrosion or wasting of stay-bolts, particularly on inside of fire-box sheet. Inspectors must also see that holes drilled in any stay-bolts are left open; anything discovered to the contrary must be noted in red ink on their reports.

## Roofing Notcher.

The Niagara Stamping and Tool Company, of Buffalo, N. Y., are bringing out a new device which they have perfected for clipping the corners of roofing sheets. It may be described as a miniature squaring shears, with gauges so arranged as to corner the sheets accurately. It is operated by the foot, and the leverage is such that three or four sheets at a time can be clipped by it. The notcher has one fixed and one adjustable gauge, thus permitting such an arrangement of gauges as will notch sheets to different sizes, as required. The up stroke of the treadle is controlled by a spiral spring. The general arrangement of the tool is clearly shown in the engraving, and requires no further description. It is supplied in two general forms—the first, as shown in the engraving,



NEW ROOFING NOTCHER.

to be attached to the ordinary work bench, and the second fitted on legs, so as to make it a complete, independent machine.

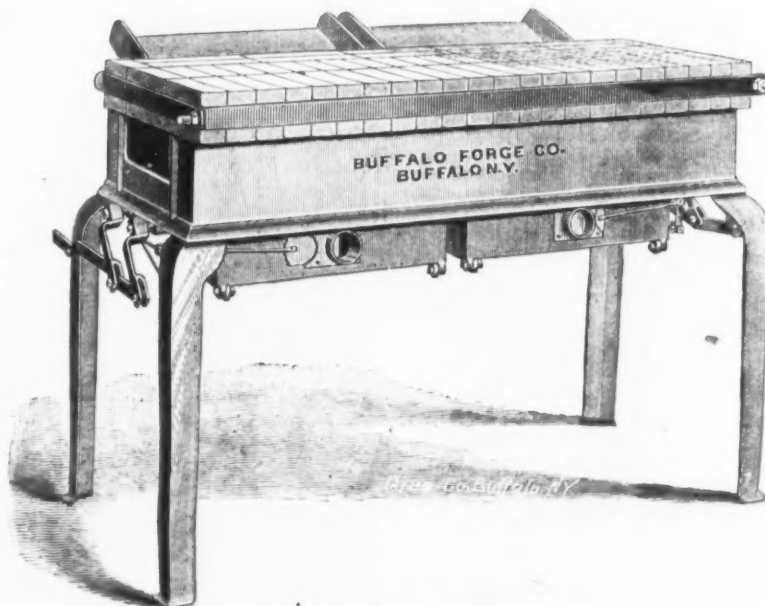
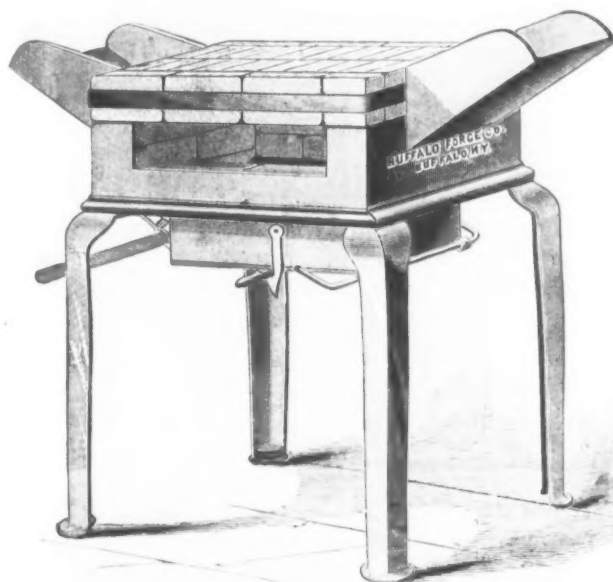
## New Heating Forges.

We show on this page engravings of two new heating forges, built by the Buffalo Forge Company, of Buffalo, N. Y. The forges are designed for heating a great variety of work where a uniform heat in considerable quantities and for any desired length of time may be maintained, such as heating rivets in large quantities for steam riveters, hatchets, hammer heads, axes and all work required to be operated upon with a steam hammer. Either hard coal or coke may be used as fuel, and blast is supplied by a power fan through inlets which are supplied with blast gates. The forges are supplied with all the latest improvements, double-shaking and dump grates, improved blast gate, &c. They can be arranged with fire openings or coal chutes on either or both ends or sides as desired.

## Contracting Chills.

One of the most fruitful causes of complaint by those railroad officials in charge of rolling stock has been the large number of chilled wheels which were continually being found to be out of round. A wheel out of round is very apt to get caught by the brakeshoe and to be slid. A spot being

which are claimed to be superior to any made in the ordinary way, especially in the following important particulars, all of which tend to insure a greatly increased mileage—viz., accurate roundness, uniformity of size, increased depth of chill, uniformity in depth of chill, and greater density and durability of chill. To insure success with this improved process of casting it is necessary to



NEW HEATING FORGES.

Built by the Buffalo Forge Company, Buffalo, N. Y.

once formed it again catches the shoe, and the result is a second flat spot, making the wheel unfit for service in a short time and usually long before its guaranteed mileage has been run. This has not been so much the fault of the wheel-makers as their misfortune. With the greatest possible care in casting wheels it has heretofore been almost impossible to prevent a certain percentage of some heats turning out this way, owing to

use a mixture made up of the best charcoal irons, which have been carefully selected, after thorough testing, because of their superior strength and chilling properties.

It is thought that the highest demands of railway service for strength and durability in wheels is thus secured. Wheels thus made can be subjected to definite physical tests which, it is claimed, will show that wheels made with contracting chills will be free from defects of workmanship or material; that each wheel will be the same diameter as the standard adopted by the Master Car Builders' Association; that in any number of wheels cast in chill molds of the same diameter the variation in circumference will not exceed  $\frac{1}{4}$  inch; that each wheel shall be so accurately round that when a true metallic ring is placed level upon the tread, and bears somewhere on the cone, it will at no point of the circumference vary  $\frac{1}{8}$  inch from the wheel tread; that the tread of each wheel shall be smooth and practically free from "sweat" or other blemishes; that the plate of each wheel shall be composed of soft gray iron, with uniform fracture; that the chilling effect on the tread of clear white iron will not vary  $\frac{1}{4}$  of an inch in depth throughout the entire circumference of any wheel, and will not, at any point, be less than  $\frac{1}{4}$  of an inch deep at the root of the flange; that 33-inch D. P. wheels, weighing 540 pounds will stand, without breaking into two or more pieces, an average of more than ten blows from a drop of 140 pounds weight, falling 12 feet and striking directly upon the hub—the wheel being supported at the outer rim, flange down, upon at least three points, on a solid bed of masonry and iron. Wheels of other sizes and weights give proportionate results, and an improved mileage is sure to result from wheels so mechanically perfect. This method of making chilled wheels, we are told, has been devised by Messrs. A. Whitney & Sons, of Philadelphia.

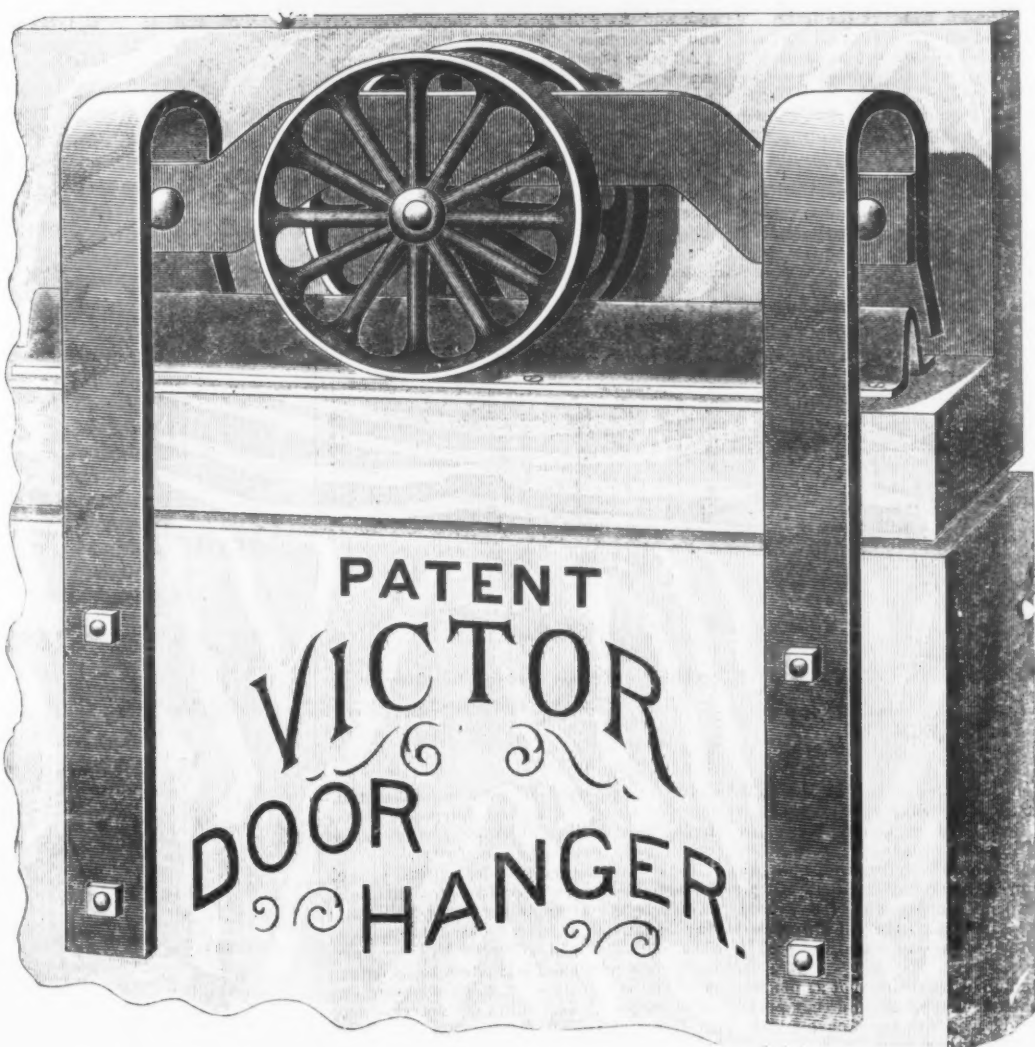
**Egyptian Petroleum.**—Egyptian petroleum is obtained both from surface wells and deep bores at Gensah and Gihel el Zeit. The crude oil is dark-brown in color, and has a disagreeable odor owing to the presence of sulphur compounds. Its specific gravity is 0.931 at 60° F., and, though viscous, the oil is fluid at low temperatures owing to the almost entire absence of paraffin. When purified it yields an oil of 0.850 to 0.950 specific gravity. It is adapted for lubricating and fuel purposes, but not for lighting. The locality where it is found is 400 miles from Suez at the entrance to the Gulf of Suez, on the western side of the Straits of Jubal. The strata in which it is found is calcareous. One boring has reached 400 feet, penetrating to coral and stiff clay, below which the petroleum is found. The crude oil is now used for lubricating engine bearings on two local steamers.



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## Flow of Metals in the Drawing Process.

From an interesting lecture on "The Flow of Metals in the Drawing Process," delivered a short time ago before the Franklin Institute, at Philadelphia, by Mr. Oberlin Smith, we take the appended extract. It refers particularly to methods of determining the dimensions of blanks for pieces of drawn work.

Mr. Smith said: It will naturally occur to the student of this subject that some easy method is desirable for determining the diameter of the blank for any given piece of drawn work, especially if its dies are to cut; as cutting edges are expensive to make—and to alter, if guessed at, and made wrong at first. Aside from lucky guessing, somewhat guided, perhaps, by analogies from other approximately similar work that dies have been made for before, I have in my own practice used three principal methods to obtain this measurement of blank diameter.

The first of these methods is the tentative one. It is the surest, but, in many cases, the most expensive. It consists in cutting blanks of as near as possible the right size and shape, by guess, and trying them successively, modifying the shape of each to suit circumstances, until the proper shape of drawn work is produced. For dies that do not cut, this isn't difficult, as the flat holding surfaces can be made plenty large enough, and whatever gauging arrangements are to guide the blank, can be put on afterward when its correct proportions are decided upon. In cutting dies the female cutting ring must be made separately, and left unfinished until the size and shape is ascertained. The male-cutting ring, which forms part of the upper holding surface, must, of course, be made, but can be left plenty large enough until this trial has been completed.

The second method referred to may be called the gravitative. It depends for its accuracy upon the principle that the thickness of the metal in a piece of drawn work is the same as it was in the original blank, which is, in fact, usually the case. My own method is to carefully weigh the sample piece of drawn work which is to be reproduced, and then, knowing the weight of 1 square inch of a piece of similar sheet metal of exactly the same measured thickness, to calculate the number of square inches necessary in the blank and make its diameter to suit this given area. This method can obviously be practiced only where a sample of the work is at hand, and where the blanks are circular in form. Certain inaccuracies may arise in the practice of this method, where there are sundry beads, corrugations, &c., near the center of the piece of drawn work, which tend to let the metal stretch when the punch comes home in the die. Such action is properly embossing, rather than drawing, and stretches the metal thinner in certain places, which of course invalidates the accuracy of this system. It is, however, often useful for work whose contour is simple in form near the central portions where a drawing action does not take place.

The third method spoken of may be called the "mensurative." This, too, depends upon equal areas and upon the thickness of the metal remaining the same. In the case of plain cylindrical work, a very simple formula, which I have worked out for the purpose, may be used. This is given in Fig. 1, equation III, for a box or cup whose corner at  $m$  is sharp, or nearly so, and in equation VI, for a round-cornered box. The latter formula is not theoretically accurate as regards equal areas, but serves an excellent practical purpose where the corner is not of too large a curvature—say with a radius not more than one fourth the depth of the cup. The diagram given in Fig. 1 is a vertical axial section of a cylindrical box or cup. It is not worth while here to give the working out of the formulae, as by a close inspection the figures will explain themselves.

In Fig. 1, let (in inches)  
 $d$  = diam. of cup.  
 $h$  = height of cup.  
 $r$  = radius of corner.  
 $c$  = arc of  $90^\circ$ , with radius  $r$ .  
 $a$  = area bottom + sides.  
 $a'$  = area blank, also.  
 $x$  = diameter blank is to be cut.  
 $a = 0.785 d^2 + \pi dh$  ..... I  
 $x = \sqrt{\frac{a}{0.785}} = \sqrt{\frac{0.785 d^2 + \pi dh}{0.785}}$  ..... 2  
 $x = \sqrt{d^2 + 4dh}$ , for sharp cornered cup. 3  
 $r + r' - c = \frac{r^2}{2} - \frac{r'^2}{2}$  ..... 4  
 $2(r' + r) - 2c = r - \dots$  ..... 5  
 $x = (\sqrt{d^2 + 4dh}) - r$ , about, for round-cornered cup, with small corner, say where  $r < \dots$  ..... 6

In Fig. 2, let (in inches)  
 $r^1, r^2, r^3, r^4, \&c.$ , = radii drawn to axis from centers of gravity of  $\frac{1}{8}$  inch segments of contour line.  
 $= r^1 + r^2 + r^3 + r^4, \&c.$ ; that is, the sum of the radii.  
 $a$  = area bottom + sides.  
 $a'$  = area blank, also.  
 $a^1$  = area of one zone whose average radius is  $r^1, r^2, r^3, \&c.$   
 $x$  = diam. blank is to be cut.  
 $a = 2r^1 \pi \frac{1}{8} \dots$  ..... I  
 $a = 2s \pi \frac{1}{8} = 0.785 s \dots$  ..... 2  
 $x = \sqrt{\frac{a}{0.785}} = \sqrt{\frac{0.785 s}{0.785}} = \sqrt{s} \dots$  ..... 3

In Fig. 2 is shown a method which I have devised for ascertaining the area of a piece of drawn work of irregular contour as regards its vertical section. This method is a graphic one, an exact profile of the

work being drawn to scale of real size, and this contour-line being laid off, from its axis outward, into sections each exactly  $\frac{1}{8}$  inch long. From the centers of these sections, at the points marked  $r^1, r^2, r^3, \&c.$ , horizontal measurements are taken to the axis. These measurements, of course, represent various radii of the piece of drawn work in question. If we let the sum of them be called  $s$ , we then get the very simple formula given in equation III. The reason that just  $\frac{1}{8}$  inch was taken for the length of these segments of the contour-line was that it happened to reduce the equation to the simple form given, while any other length would have made it more complicated. The principle here involved is, obviously, that of the area of any zone being its width, multiplied by its circumference at a point representing the center of gravity of its single cross-section. The points marked  $r^1, r^2, \&c.$ , are, of course, not accurately in the center of gravity of each of the little segments, but they are practically near enough so. The same principle occurs in this method as in the last-mentioned one regarding places in the metal which will stretch thinner when formed to shape, like deep beads or other indentations. This trouble may be mostly neutralized, however, by bridging over them, so to speak, in making the contour line—that is, by running the latter across from point to point of the corrugations instead of following their curves, wherever it is judged that stretching will take place. This amended contour is shown at  $n$ , Fig. 2, by dotted lines, and on it the segments should be laid out.

In making drawn work whose top view is elliptical, instead of round, the formulae above given may be used with some modifications. To do this the ellipse is treated separately as regards its short and long axes, and values are inserted in the two equations which would be used for circles which approximately coincide with the sides and ends of the ellipse at the termini of its respective axes. In making rectangular work with round corners some idea of the shape of the blank may be obtained by treating the corners as belonging to a circle

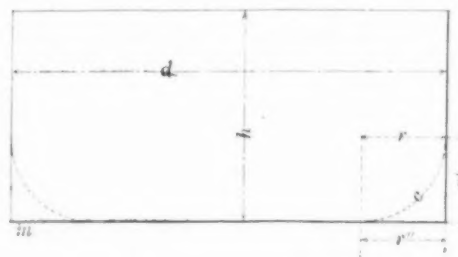


Fig. 1.—Area Diagram for Cylindrical Article.

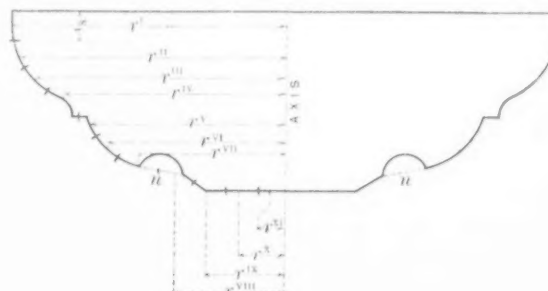


Fig. 2.—Area Diagram for Article of Irregular Contour.

## FLOW OF METALS IN THE DRAWING PROCESS.

of the proper diameter, while the sides of the rectangle (which properly are not drawn at all, but only bent to shape), may be treated nearly by actual measurement, as in them very little stretching takes place. As regards the corners, however, the tentative method is the safest wherever it is possible to use it. It may be of interest to state that certain kinds of work are drawn from whole sheets of metal, wherever such sheets are only a little larger than the blank which would otherwise be used, and the cutting to shape is done in a pair of "trimming" dies afterward. This method is frequently used for such work as wash-bowl bottoms, dust-pans, halves of toy animals, &c., and gives an accuracy of edge contour not attainable the other way.

As an accessory to the process of drawing, the old-fashioned process of spinning is sometimes used, for finishing certain details of shape which cannot be done in the dies. The drop press is also occasionally brought into requisition for finishing certain shapes. Much more common than either of these, however, is the process of roller-spinning before referred to. This is very much more rapid than the old-fashioned hand-spinning with a burnisher, and is done very quickly by a cheap quality of labor. It is used for crushing out body-wrinkles in washbowls, conical pans and such work. One or more of these articles are placed upon a steel chuck, without even stopping its revolution, and being pushed up solidly by a loose pad upon the dead-spindle of the lathe, so that they are driven by the friction of the chuck, a hardened steel roller, mounted upon a slide-rest, is rapidly passed once over them, under considerable pressure, and thus the wrinkles are entirely removed.

With regard to the future possibilities of this interesting process of drawing metals we probably can form but a primitive idea. Already articles as large as soda-water fountains and the halves of kitchen boilers are drawn from a flat sheet, and it would be simply a matter of first cost for plant to draw large steam boilers in the same way. There would certainly be no real difficulties, except the expense of plant, in drawing such things as bathtubs, boats of small sizes, &c. Of the real value of this invention I think the public have a very inadequate idea—perhaps because there is so little generally known about it, the practice of the art being mostly confined to a few large and very secretive-minded factories. To it mainly, however, we owe the wonderful cheapness, abundance and variety of the household utensils, which help in some degree to lighten the burdens of toiling millions of wives and mothers the world around.

In the United States Circuit Court at Milwaukee, Wis., John P. Dorr and others have brought suit against the Champion Horse Nail Company, of Appleton, to restrain the issuance of preferred stock. The capital stock of the company is \$50,000, and it is proposed to make \$38,000 of it preferred stock. The question involved is whether a corporation can issue preferred stock unless authorized to do so by its articles of incorporation.

## The Iron Ore Decision.

Although the decision of the Secretary of the Treasury, that iron ore as known to commerce is the ore in its natural state irrespective of moisture, has been announced, and the collectors of customs have been notified that their original instructions are revoked and to assess duty upon the actual weights as reported by the United States Weigher at the time of importation, deducting legal allowance for addition of sea water, as per existing statutes. The opinion of the Attorney-General on the subject is now officially promulgated and may be interesting reading to those engaged in iron-ore industry.

DEPARTMENT OF JUSTICE.  
WASHINGTON, JANUARY 19, 1887.

SIR: Your letter of the 12th of January, 1887, submits for consideration substantially the whole question whether the word "iron ore," as used in the tariff act of the 3d of March, 1883, is iron ore dried at a temperature of  $212^\circ$  F., or iron ore as it is delivered at the port of entry for weighing.

Thus, broadly stated, the response to the question would involve a determination of facts as well as law which if undertaken would involve an assumption of power not by law committed to me.

Upon the disputed facts I cannot pass; but upon the facts found by you, and the briefs of arguments made before you, it is not improper to announce such principles of law as materially aid you in reaching a truthful result.

In an opinion rendered on the same subject on the 17th of September, 1886, the principle was declared that the iron ore of the statute was to be interpreted as the "iron ore of commerce." What the iron ore of commerce was left as a question of fact to be determined from knowledge possessed by, or evidence submitted to, you. The testimony laid before you was found to be inconsistent—the importers mainly testifying that ore dried at  $212^\circ$  Fahrenheit is the iron ore of commerce; the home producers, that ore, as ordinarily delivered for weighing, is iron

before you what state the ore must be in to be the iron ore of commerce, other considerations may aid you. The intent of the law-maker is the law, and outside of the words some reflected light may be invoked. Other earlier statutes have imposed customs duties on iron ore, which have been collected probably for a very considerable time before the passage of the act of 1883. In the administration of such laws doubtless departmental practice has established what was understood and acted upon as to the collection of customs on iron ore. If that practice and departmental interpretation was of long standing and uniform prior to 1883, if the interpretation had been false and vicious, it is to be presumed Congress would have guarded against a like interpretation upon the passage of the act under consideration. But as no such guards are found indicating a repudiation if any prior interpretation, the presumption is very strong that the legislator, in the enactment of the act of the 3d of March, 1883, adopted and understood the iron ore of commerce to be what the departmental practice had established it. On the 8th of September, 1879, a decision was rendered by the Secretary of the Treasury (No. 4153) ruling that "the total quantity landed, as shown by the weigher's return \* \* \* without allowance for increase of weight from moisture on certain iron ore" was subject to duty. If this decision was in accordance with departmental practice prior to that date, and was adhered to afterward as the rule, it would be a pregnant fact to guide you to the same conclusion.

The result of the legal principle above considered is substantially:

1. In customs laws, as in all others, the intent of the law-makers is the law.
2. Where, in the expression of that intent, a name is used describing an article which has a well established commercial significance, that commercial significance should be adopted.
3. When the name is general and the tariff specific it embraces the whole class, and questions of price, value or accidental chemical components are immaterial.
4. The commercial significance of a name

and, in fact, a vast amount of supply coal that never gets into the returns. In the item of anthracite, we have given here the shipments of commercial coal only:

	1881	1885	1886
Alabama	2,000,000	2,225,000	2,500,000
Arkansas	15,000	175,000	175,000
California	25,000	150,000	150,000
Colorado	1,200,000	1,250,000	1,400,000
Dakota	50,000	75,000	30,000
Georgia	200,000	200,000	200,000
Idaho	20,000	40,000	40,000
Illinois	10,101,000	9,791,874	9,250,000
Indiana	2,500,000	2,375,000	3,000,000
Indian Territory	400,000	500,000	400,000
Iowa	3,000,000	3,500,000	4,000,000
Kansas	1,000,000	1,000,000	1,500,000
Kentucky	1,200,000	1,200,000	1,500,000
Maryland	2,400,000	2,400,000	2,450,000
Michigan	45,000	30,000	40,000
Missouri	2,500,000	2,750,000	3,000,000
Montana	50,000	50,000	50,000
New Mexico	200,000	300,000	375,000
Ohio	9,000,000	9,000,000	9,500,000
Oregon	60,000	100,000	100,000
Pennsylvania	30,718,250	31,621,720	32,130,392
Rhode Island	25,000,000	25,000,000	27,000,000
Tennessee	1,200,000	1,400,000	1,700,000
Texas	125,000	125,000	125,000
Utah	250,000	250,000	250,000
Virginia	300,000	600,000	1,000,000
Wash. Terr.	800,000	400,000	475,000
W. Virginia	3,000,000	3,100,000	4,000,000
Wyoming Terr.	1,000,000	900,000	800,000
Total	99,448,062	102,124,558	106,780,033

After a general review of the coal industry during the year 1886, Mr. Seward goes into a detailed statement of the coal mining in the different States and Territories, arranging them alphabetically. The full statistics are presented, showing the fuel receipts of leading cities throughout the country, with prices and in some instances rates of freight. Altogether, Mr. Seward's little book contains a good deal of information in a convenient form, which is usually accessible only after a tedious search in the columns of many newspapers and State documents. As such it will prove serviceable to many in the coal trade, and in industries largely interested in the question of cheap fuel.

PAST, PRESENT AND FUTURE OF THE CITY OF ALLENTOWN, published under the auspices of the Board of Trade.

Following the example of the Boards of Trade of many cities that of Allentown has published a very creditable pamphlet, over 150 pages, reviewing the history of that ancient town, some information concerning the customs and habits of the quaint stock of the old Dutch city and its institutions, followed by presentation of its leading banking and industrial enterprises, among which, of course, iron, hardware and allied industries play an important part.

THE NEW SOUTH. By M. B. Hillyard. Published by the Manufacturers' Record Company, Baltimore, Md., 1887.

In view of the tremendous development which is now going on throughout the Southern States, accompanied, as such movements generally are, by some excessive local speculation, any literature bearing upon the resources of that long-neglected section of our country is particularly timely and valuable. It is natural that the accuracy of the data should suffer for the lack of attention given to it for so many years. The South has had few or no State geological surveys for many decades, and the few which have had a brief career have only too often been in the hands of incompetent men. How far this is extended to other departments of industry we are not in a position to state, but, so far as the mineral resources of the country are concerned, the really good work has been done almost exclusively by private enterprises. We note these facts because they naturally have a tendency to embarrass any one aiming to present a thorough and accurate review of the resources of so large a territory. Then to any data obtained by private investigations a personal factor of safety must be introduced of every individual case. This implies a complete and searching critical examination, not alone of locality, but of persons, too. It is a matter of judgment upon which even two experts are not likely to agree. Mr. Hillyard has brought to bear upon the work he has undertaken the untiring industry of a compiler, but has not quite succeeded in all cases in rejecting unsatisfactory or unreliable evidence. This crops up now and then in those parts of the volume which deal with the subject of special interest to us—the coal and iron resources and their possibilities for the future. M. Hillyard has written an admirable introductory review of the agricultural and mineral resources of the South with a discussion of those elements which principally affect their development. We have been particularly struck with his presentation of the influence upon the whole South of that great class in it of which so little is known and generally so little is thought, the "poor white man." His progress has been slow, but it has been steady, and in the aggregate represents a reserve power which only too many economical writers have entirely neglected or have even gone so far as to speak disparagingly of. The plan of Mr. Hillyard's book is to take up State by State and deal with its resources. He has been forced of course in the presentation of statistical data to be content with census figures. This naturally did not present the advances made during the past few years, which, we believe, will be found to have told more than decades preceding it. The work contains some illustrations which, however, are not of the kind likely to be most useful to the reader. It would have been well to print some graphic statistical charts and maps which would have largely increased the utility of the work. In some respects it is superior to, in others does not come up to, the volume recently published by the Bureau of Statistics, still we believe that it merits the success which we understand it has met with. It is rough and uneven in some respects, but we believe that its author has gone far in mastering a subject which he may be able to present a little more thoroughly in the future.

Messrs. Clark, Raffen & Co., whose works are at Kingsbury and Ohio streets, Chicago, have recently secured a large contract for the ironwork of a business block in San Antonio, Tex. The competition for the contract was keen.

## NEW PUBLICATIONS.

## ANNUAL REPORT OF THE NEW YORK METAL EXCHANGE.

The New York Metal Exchange have printed a neat little pamphlet giving the Address made at the annual meeting by its president, Mr. Geo. B. Tompkins, the treasurer's statement, and the annual report by Edward J. Schriver, secretary to the president and board of managers. This report shows that, during the year ending February 28, the sales of pig tin footed up to 11,015 tons, as against only 1780 in the previous year. The sales of other metals are small, while in iron not a single transaction was reported during the year. Financially, the Exchange is doing fairly well, and it has certainly become the center of the tin trade of the country, rivaling London in that respect. There has been some talk of removing the Exchange nearer the speculative centers of the city, and it is reported that some efforts have been made to increase the annual dues, apparently with the general object of proposing a salary for the president. The complete failure to secure even the slightest fraction of the enormous trade done in this city in iron, steel and old material appears to be giving much concern to the managers of the Exchange, who only hope in this direction appears to lie in arousing an interest in speculative dealings among the general public.

THE COAL TRADE. By Fred E. Seward, editor of the Coal Trade Journal, 1887.

Mr. Seward's annual review of the coal trade has again appeared this year, bringing the 14th of the series in enlarged and improved form. It gives as usual statistics of the production in the different leading countries of the world and in the United States. The following is Mr. Seward's estimate of the product of this country during the years 1884, 1885, and 1886:

The figures below are authentic and fairly represent so many gross tons; while the returns from certain States are made in net tons, there is always a large amount of coal used by local industries, the mining population, railroads in the districts, country banks for farmers' use, small mines that are not under the mine inspector's regulations, and







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# The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, April 7, 1887.

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CHAS. KIRCHHOFF, Jr., Editors.  
GEO. W. COPE, Associate Editor, Chicago.  
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### The Lake Copper Mines in 1886.

The publication by a number of the leading Lake Superior copper mines of annual statements showing the amount of work done and its cost furnishes an excellent means of gauging the effect of low prices upon a great industry. What are the real averages of the returns received for product is annually shown in a number of these reports. According to the data published by six companies selling 10,568,855 pounds in 1883, the average price realized there was 15.42 cents. In 1885, five companies which sold 11,991,050 pounds of copper, obtained on an average 10.98 cents per pound for it last year, the Atlantic, Allouez, Franklin and Huron companies together sold 11,486,125 pounds, at an average price of only 10.90 cents. In other words, there has been a decline in three years of nearly 30 per cent. in the returns for the product. The strain of such decline upon any industry must necessarily be tremendous, and it has been especially great upon the smaller Lake Superior mines, because they were working at close margins before the drop, handling, as some of them do, very large quantities of very low grade rock. Some have succumbed, but so admirable has been the management of quite a number of others that, in spite of only small reduction in wages, they have been able to keep costs below average prices realized. The following are the figures (cents per pound) for a series of years:

Cost of Production at Lake Mines.					
	1882	1883	1884	1885	1886
Quincy	9.50	9.44	8.63	7.50	6.78
Osceola	12.97	12.21	11.24	10.90	8.07
Franklin	13.00	12.57	11.02	10.03	9.34
Atlantic	13.80	12.80	10.88	9.37	9.52
Allouez	17.38	15.98	12.43	11.29	
Huron			14.78	11.75	13.59
Tamarack					7.49

The cost for 1886 of the Quincy Company is exclusive of construction account. The Allouez is in the hands of lessees, and the report for the Tamarack is only for the first six months of 1886. No data are available for the Calumet and Hecla mine, whose net cost is probably, excluding construction account, lower than any of the others, because its rock is nearly twice as rich. The question of grade, regularity of distribution and hardness of rock of mine principally affects

the cost of production. So far as the richness of the rock is concerned, the following data will prove of interest:

### Percentage of Yield of Ingot Copper.

	1881	1882	1883	1884	1885	1886
Quincy	2.62	3.21	2.70	2.70	2.51	2.54
Osceola	1.29	1.31	1.17	1.17	1.29	
Franklin	1.10	1.39	1.45	1.46	1.88	
Atlantic	0.72	0.69	0.75	0.74	0.71	
Allouez	0.95	0.87		0.84		
Huron			1.45	1.18	1.54	
Tamarack					2.74	

A glance at these figures and at the table of costs will convey a clear idea of their relation to one another. The increase in the output of the greater number of the mines referred to has, of course, a good deal to do, too, with lowering of the price at which the copper can be laid down in New York, the figures above including freights, commissions, and all expenses of mining, smelting and marketing. We give below a table showing the development of the production at the leading mines.

### Production of the Principal Lake Copper Mines, Net Tons.

	1882	1883	1884	1885	1886
Cal. & Hecla	16,026	16,563	19,050	23,624	25,259
Quincy	2,858	3,006	2,840	2,924	2,967
Tamarack				92	1,834
Osceola	2,088	2,128	2,124	973	1,780
Franklin	1,632	1,744	1,874	2,004	2,132
Atlantic	1,316	1,341	1,584	1,791	1,732
Allouez	842	876	984	1,085	1,053
Central	677	634	723	1,079	1,296
Huron	182	360	964	1,136	995

A comparison of these figures with the yield will give some indication of the very large quantities of rock handled. Taking, for instance, the Atlantic mine, which crushed 247,035 tons of rock, obtained from breaking 14,724 cubic fathoms of ground, the bulk probably from a depth of over 1000 feet on the dip. Its cost per ton of rock was as follows:

Mining, selecting, breaking, taxes and surface expenses	80.88	cents.
Transportation to mill	8.48	"
Stamping and separating	26.53	"
Freight, smelting, marketing, office expenses, &c.	27.12	"
Total	\$1.88.01	

To blast hard rock, hoist it to the surface, crush it in a stamp mill, wash out of it only 0.98 per cent. of impure copper running 72.25 per cent. of metal, refine it, send it to market and pay the expenses of selling, finally making a profit of 15.29 cents on every ton of rock treated, is indeed a feat which is unparalleled in the mining of any useful mineral in any country. Nor does the Atlantic stand alone in this respect on Lake Superior. There are others doing as well under other circumstances. Reductions of cost even of a fraction of a pound.

The data given show clearly which mines are able to produce copper at going prices. It may be said that practically all of the leading mines can live at about 10 cents a pound for the metal. Their capacity for production is roughly between 72,000,000 and 75,000,000 pounds, to which should be added the output of a number of smaller mines worked by tributaries, or being put into shape for cheap production by strong companies. The three mines which can go on without losing money at 7½ cents, the Calumet & Hecla, the Tamarack and the Quincy, can together turn out with present equipment between 60,000,000 and 65,000,000 pounds of copper. In other words, the Lake Superior district would not be forced to materially curtail its output at figures which would close down nearly every mine in the world, should low prices prevail for any length of time. There are few mines in this country outside of the lake mines who could for any long period stand the pressure of a market equivalent to 9 cents for Lake, which is equal to about 8½ cents for other brands. We do not possess any exact data concerning the Montana producers, but it is evident from the happenings of the past two years that even an average of 10 cents for their refined copper is dangerously near their cost line. It is true that some relief has been accorded to them lately by the fact that copper refiners are becoming more liberal in their terms of payment for the silver contents of Montana mattes, and this may become a more important factor in the future. As yet, however, it tells only on a comparatively small proportion of the Montana make, the bulk of the mattes produced in Butte being too low in the precious metal. So far as Arizona is concerned, present prices are below cost. The result of the decline here and of the better feeling abroad has been to divert again larger quantities of Montana product to England, thus restoring the balance which was oppressively against these markets during the second half of 1886.

The Traders' and Travelers' Union has lately sent out a circular signed by its general manager, Mr. Russell P. Hoyt, in which it reviews the decision recently rendered by the United States Supreme Court in the two cases involving the right of States to insist upon the payment of licenses by commercial travelers, representing houses in other States. That decision was adverse to the tax, so that no State or local government deriving its authority from a State can lawfully tax a commercial traveler for the privilege of soliciting orders for a house located in another State. A crying abuse has been thus, it is hoped, summarily and finally disposed of, and the only question which is still unsettled is whether the decisions referred to determine that the license tax of \$200 in the District of Columbia is invalid. The payment of this tax has been evaded so far by the payment of small sums to brokers in Washing-

ton possessing individual licenses, upon affidavit that the travelers are part owners of the goods for which they solicit orders. It is stated that about 4000 of these affidavits have been filed in the District Commissioner's office during the year 1886. Such an abuse should not be allowed to continue, since it places Washington in the curious position of being the only city of any consequence in the country in which a tax has the shadow of legality.

### Employers Not Masters.

The late national convention of builders at Chicago acted very sensibly in eliminating the word "master" from the title of the organization, which is an outgrowth of their deliberations. The association is to be known as the National Association of Builders of the United States of America. The proposed organization had been alluded to in preliminary proceedings as an association of master builders. The term was one which had evidently been used, just as many other expressions of doubtful taste are frequently employed, because most people are inclined to repeat what they hear without bestowing any thought upon the exact meaning of the words. From time immemorial local associations of persons engaged in the building trades have been in the habit of styling themselves master builders, master carpenters, master plumbers, master bricklayers, master plasterers, master painters, &c. Out of a list of 169 such associations located in various sections of the country, which list had been prepared for the use of the national convention, no less than 104 names contained the word "master," two substituted for it the more objectionable word "boss," while the remainder consisted of builders' exchanges and associations of such a character that the word "master" could not very well be used, which to some extent explains its non-appearance as part of their titles.

It is not many years since the word "ironmaster" was equally common in the iron trade. Every man who owned or had an interest in a blast furnace, rolling mill or forge, was called an ironmaster or alluded to himself as such. Organizations of manufacturers almost invariably adopted the word as part of their name. Reports of conferences between manufacturers and their workmen characterized the former as "master" and the latter as "their men." An official journal of a manufacturers' organization, published in Philadelphia as late as 1873, was known as the *Ironmasters' Gazette*. Now, however, except among the oldest members of the trade, with whom habit grew to be second nature, the term is obsolete in America. It is still used abroad, where the relations between employers and employees are very different from those existing in this country, and where changes of any kind occur much less rapidly than here. The elimination of this word from ordinary use in the American iron trade was not brought about by any sudden movement against it either on the part of workmen or employers. It simply passed away in due course of time, because it was not in harmony with the progress of the age and the growing importance of workmen engaged in mechanical pursuits as a great factor in the maintenance of our national institutions. The men employed about our ancient charcoal furnaces, whose interests in almost every particular were paternally regulated by a lordly proprietor, looked up to him as a master, but the independent workmen in modern ironworks regard themselves as abundantly able to take care of their own affairs, if indeed they may not often be charged with a disposition to manage those of their employers.

But as a time came when iron manufacturers dropped the word "master," so does the time now seem to be at hand when it will be dropped by the building trades. Their national association has very properly taken the initiative, and its example will not doubt be followed by the local associations. This course was foreshadowed by the New York delegation to the convention, who introduced a resolution stating that the term "master" is one that indicates the condition of servant, and which time and circumstance have to a great extent caused to grate harshly upon the ears of sensitive people, and recommending that this term should be as far as possible eliminated from the titles and records of all societies and organizations hereafter having representation in the National Association of Builders. The reading of this resolution was received with marked approval, which was strongly indicative of an awakening of thought upon the subject.

We are again in the midst of a period of "record breaking," so far as our iron and steel works are concerned, the incentive of full order books keeping every manager in the country driving his plant at full speed. Some very high figures of product have been reached lately, North Chicago and Edgar Thomson particularly making splendid spurts. For a smaller plant, however, the Homestead Steel Works, Carnegie, Phipps & Co., Limited, have eclipsed former records. Mr. Julian Kennedy, the general superintendent, informs us that, with its two 4-ton converters and one casting pit, making 10 turns of eight hours a week, the product for March was 19,572 gross tons of ingots. The best turn, with 61 blows, was 318 tons, and the best 24 hours'

work was 915 tons. Only a few years ago such an output would have been regarded as excellent work for two large vessels.

### State Bridge Inspection.

We alluded last week to the fact that the Railroad Commissioners of this State have for some time been doing a good deal of work in the direction of insuring increased safety of travel to the public by making a thorough investigation of the railroad bridges. We have since learned that the fruit of the labors of the commission have been gathered in the form of a bulky report, the proof sheets of which are now in hand. As early as 1884 the commissioners sent out a circular to the officers of the roads in the State, asking for drawings of their bridges and for strain sheets. It is reported that at first reports came in very slowly indeed, probably because many of the roads did not possess the data called for. As we have already noted, in many cases the roads called upon the bridge works for the necessary information, and it was thus that gradually the Railroad Commissioners accumulated a large amount of data, strictly technical in their character. These have been for a year or more placed in the care of Chas. F. Stowe, a graduate of the Rensselaer Polytechnic Institute, appointed for the special work of revising the data and compiling the report. As a standard for those of the 3500 bridges in the State, where maximum loads were not reported, the report assumed 80,000 pounds as the weight of a locomotive on standard gauge roads, with four driving wheels and a 14.75 foot wheel base. The running load behind the tender is calculated at 2240 pounds to the foot of track, the Board allowing on iron members of bridges a 10,000-pound maximum stress, and for wood 800 pounds in tension. It is understood that this work is the needed preliminary to enable the commissioners to demand strengthening or replacement of structures found to be too weak. It is stated, and we have the evidence from outside sources, too, that this work has met with the cordial support of the railroads, and has been supplemented by independent inspection. There can be little doubt that the strength of many bridges has not been made to keep pace with the growing weight of rolling stock. The older wooden structures have nearly all disappeared, but many of the iron bridges first put up have never since been strengthened adequately. This work is now going on briskly. The fearful responsibility which a disaster places upon railroad officials is keenly felt by some officers at least, and it is reported that a recent accident on one of the great trunk lines has had an important share in bringing its president to reach the decision to retire from active management. Then, too, railroad men realize that it is poor economy to take any risks whatever. The Pennsylvania railroad is even going so far as to gradually replace its bridges by stone structures, an example which, however, few are likely to follow for the present.

As furnishing an additional guarantee of the safety of the traveling public, the action of the New York Railroad Commissioners will be generally approved, and it is hoped that the initiative taken by them will stimulate similar action elsewhere. It should be distinctly understood that the inspection on the part of State officials does not carry with it any assumption of responsibility. Its function, we take it, is merely to act as a check against the dangers which might grow out of a niggardly policy on the part of railroad management, or ignorance or neglect of duty on the part of employees. In that light bridge inspection has as much reason for being as boiler inspection.

### Northwestern Real Estate Booms.

The wild speculation in town lots which is now running its course in centers or prospective centers of population in the Lake Superior iron ore regions seems to be engineered by Minneapolis and St. Paul capitalists, who are engaged in the business systematically. Having exhausted the capabilities for speculation in real estate at home for the present they have turned their attention to other localities where the conditions are favorable for their operations. Duluth, Ashland and Sault Ste. Marie have in turn felt the stimulating influence of their skillful methods. They buy choice property boldly, work up an interest in real estate transactions, keep matters in a ferment until capitalists are attracted from other places, sell out at a handsome profit, and leave for fresh fields. In some cases, notably at Ashland, Wis., the boom continues after they have departed, the impetus given to such transactions being too great to be suddenly checked.

Last week the report was published that the real estate transactions at Ashland for less than seven days had been of such magnitude as to put to shame those of a great metropolis. The register's office, although working with a large extra clerical force, is from 10 days to two weeks behind in the mere matter of recording transfers. Marvelous stories are told of the enhancement in value of property in this small city during the past month. An instance is given of a residence lot selling at 10 o'clock for \$1500, changing hands at 12 for \$2500, and passing to another buyer at 4 for \$5000. Sharper are taking advantage of the situa-

tion to sell lots located in the woods miles away from the city, or in a deep ravine, or by actual survey out in the bay half a mile from shore. A prolific crop of lawsuits is expected to follow this wild scramble for a part of the little city of Ashland, the shipping port of Gogebic iron ore.

Similar reports are now coming from Sault Ste. Marie, which is the scene of the present operations of the "boomers" from the twin cities of Minnesota. Prices have already gone to fabulous figures, and outsiders are being attracted to the place in the hope of reaping a little benefit from the movement. It is reported that other cities in the West have been put down on the programme of the "boomers" for operations in this line in due course of time.

Taken in connection with the iron mining fever, the speculative mania in the Northwest seems to be an offset to the speculations going on in the South. In both sections there is a reckless investment of capital without regard to the possibilities of the future or the limitations of trade. In both sections legitimate business is being interfered with. Industrial enterprises which depend upon low taxes, cheap land and reasonably paid labor find themselves confronted with dear lands, a possibility of high taxes and a certainty of discontented labor. The profit in these speculative operations is undoubtedly great for those who have the knack of unloading quickly, but evil results follow in their train, and it may take years for some of these towns affected to recover from the effects of the giddy whirl of excitement into which they have been plunged by speculators who have no thought of making permanent investments.

### Five Years of Ship Bounties in France.

It will be remembered that in 1881 the French Government and Legislature undertook the expensive experiment of giving a lift to ocean navigation through the instrumentality of a bounty. Doubts were expressed at the time by many as to the result likely to be obtained in the long run in return for an annual expenditure of about 10,000,000 francs. Last year's returns, it is true, show a notable increase of tonnage in vessels loaded, the bulk of it being in vessels under the French flag trading with Transatlantic countries and the French colonies, for which alone premiums are paid. It is nevertheless doubtful whether the increase, which amounts to 170,000 tons in vessels entered and 156,000 tons in those cleared, is an equivalent for the outlay. Since 1881 the tonnage of French vessels has increased but comparatively little more than that of vessels under foreign flags; hence in reality whatever gain there has been may be attributed to the natural development of commerce rather than to the stimulus of the bounty system. Since 1881 the joint tonnage of vessels entering with cargo under the French flag has risen from 3,919,562 to 4,385,258, while that of vessels under foreign flags increased from 7,962,909 to 8,034,590. The clearances under the French flag were 3,354,915 tons with cargo in 1881, whereas in 1886 they were 4,346,578 tons. Under foreign flags 4,184,107 tons left French ports in 1881, and 4,678,024 tons cleared in 1886. The apparent anomaly of the large tonnage of vessels with cargo under the foreign flag as compared with the clearances under the same arises from the fact that a differential flag duty is levied on vessels clearing from France for the French colonies under foreign flag. Consequently the latter is excluded from such trade.

Navigation between France and Transatlantic countries, including the French colonies, comprises sailing vessels, commercial steamers and mail steamers; of these only the latter do not receive a premium, but get a subsidy instead. As during late years new lines of subsidized mail steamers have gone into operation and the old ones have been increased in number and capacity, there is every indication that the bulk of increase in tonnage has been precisely in subsidized mail steamers. Up to date no statistics have been published, showing the proportion in point of tonnage between vessels receiving the bounty and those not receiving it. If the system of paying premiums on ocean navigation had shown results somewhat on a par with the sacrifices made, we may feel assured the official returns would not have been wanting in order to justify the outlay. The payment of premiums resolved upon in 1881 was limited to 10 years, but even now there is a movement on foot to induce the Government and Legislature to extend the term beyond the 10 years. The Government instead of listening to such proposals has declared quite recently that it would be altogether premature to attempt perpetuating a measure involving a considerable annual outlay before the results obtained speak in favor of it, a thing so far not apparent. It should here be mentioned that vessels built in France receive extra premiums, a circumstance which has led to quite a falling off in the importation of vessels built abroad. Thus, in 1882 there were placed on the French Register 108,000 tons of iron vessels built in England; in 1885 only 6455 tons were thus introduced, though last year the total rose to 20,791 tons.

Some very uncomfortable revelations have been made in England in regard to the navy of that country. It appears from the testimony gathered by a Parliamentary com-



mission that favoritism was shown in the most unblushing manner in awarding contracts for the building of machinery. Again and again the lowest bidders were neglected or ruled out on technicalities, although they were respectable, competent, and reliable concerns. Mr. W. Pearce, himself a builder and a member of the committee, in a newspaper article made the broad, unqualified statement that he could not recall a single British armor clad that could reach New York at all under her own steam power.

#### Saturday Half Holiday.

A bill altogether pernicious in its character is pending in the New York Legislature, having already passed the Senate, which makes every Saturday afternoon a legal holiday. Manufacturers and other employers are not a little disturbed by the prospect, as the bill is by no means certain to meet with opposition in the Assembly. The bill purports to be in the interest of the day laborer, its framers evidently hoping that it will lead to a reduction of hours of labor without any change in the pay. As such the effort is one which in the long run will do little good to those whom it is intended to benefit. The fact is that the hours after 12 o'clock on Saturday are largely used to put many little things to rights for the beginning of the next week's work on Monday. The labor done is never equal to the average of the balance of the week, and a good many manufacturers in summer have voluntarily made the afternoon of Saturday a holiday for that season.

The most dangerous phase of the bill is, however, that part of it directly affecting all business interests, as will appear from the following clause designed for the protection of banks:

All bills, checks and notes otherwise presentable for acceptance or payment on any of the said days shall be deemed to be payable and be presentable for acceptance or payment on the secular or business day next succeeding such holiday; or in the case of a half-holiday shall be presentable for acceptance or payment at or before 12 o'clock noon of that day. Provided, however, that for the purpose of protesting or otherwise holding liable any party to any bill of exchange, check or promissory note, and which shall not have been paid before 12 o'clock noon on any Saturday, a demand of acceptance or payment thereof may be made any time after 12 o'clock noon on said Saturday and notice of protest or dishonor thereof may be given on the next succeeding secular or business day. And provided, further, that when any person shall on any Saturday receive for collection any check, bill of exchange or promissory note, such person shall not be deemed guilty of any neglect or omission of duty, nor incur any liability, in not presenting for payment or acceptance or collecting such check, bill of exchange or promissory note on that day. And provided, further, that in construing this section every Saturday until 12 o'clock noon shall be deemed a secular or business day.

So radical a departure from banking usages as is here contemplated—changing a rule in the State of New York which has been recognized for centuries in every State in the Union—would lead to endless trouble and vexation.

#### The Advantages of Tuscaloosa, Ala.

To the Editor of The Iron Age, New York: It has for some time been the writer's intention, since the late development in Tuscaloosa, to again call the attention of the general public to the claims of the place, as by your kindness he was formerly permitted to do through the columns of your influential and widely circulated journal, and to set forth some of the many advantages possessed by the town of Tuscaloosa as a center both of manufacture and commerce.

Tuscaloosa is situated at the head of navigation of the only water outlet from the great Alabama mineral field (its position being exactly analogous to that of Pittsburgh), and at the southern extremity of the Warrior coal field, with iron ore within 17 miles in one direction and within 5 miles in another, both locations being immediately on the line of the Alabama Great Southern Railroad. To the south of the city lies the great Black Belt of Alabama, comprising the bottom lands of the Warrior River, which widens out on either side and form one of the finest cotton raising countries of the State, while to the west lie the equally productive cotton lands of Central Mississippi. This fact—that the city is thus surrounded with iron and coal, and is at the same time in the most advantageous position to secure and handle the great cotton crops of two States—is evidence enough to any thinking man that it is the natural center of the iron and cotton manufacture of this district.

Geologists all agree in saying that the coal measures in Tuscaloosa County are thicker than in any other portion of the field. Here is the exact language of the last report made by the Alabama State Geologist: "Tuscaloosa County.—The coal measures of this county are believed to be thicker than in any other part of the Warrior field, or in any other field of the known world. There are in these measures some 53 seams of coal which vary in thickness from about 2 inches to 14 feet, and which have an aggregate thickness of about 125 feet of pure coal. Of these 53 coal seams 25 are of workable thickness, or contain 18 inches and over of pure coal; of these 25 seams 14 have 2 feet and 6 inches and over of coal; of these 14 seams nine have over 4 feet of coal, and of these nine seams three have more than 6 feet in thickness of coal. Among these coals are to be found every variety of bituminous coal. Some of them are bright and hard and well adapted to handling and stacking, while others are of a duller color and are of a friable and crumbly nature; some of them appear to be especially fitted for coking and blacksmithing purposes, while others might be called steam or heating coals, and others still gas coals."

As Tuscaloosa is situated directly over the coal seams to which these quotations refer, it goes without saying that fuel at this place is at a minimum as to cost and a maximum as to quantity and quality. An extension of the Birmingham "red mountain" comes within 17 miles of the city along the line of the A. G. S. R. R., rich in iron ore and limestone. Not more than 5 miles to the south, and on the same railroad, are large deposits of brown ore of a different formation. The Warrior River, flowing as it does through the great cotton belt of the State from end to end, assures to its manufacturers an abundant and cheap supply of this material. The supply of long-leaf pine and hard woods lying on the coal lands to the north of the city is very large, making this point especially adapted for the manufactures of wood from long-leaf-pine flooring to agricultural implements, furniture and cabinet work.

So much for the manufacturing outlook—the commercial advantages are equally striking. The Warrior River is the highway of the great cotton region which it bisects. It bears away to the world of manufacture the products of the soil, and in return brings back the breadstuffs and other commodities which must be procured abroad. Tuscaloosa, by right of geographical location, should be the receiving and distributing point of this trade. The Tuscaloosa Northern Railway, now being surveyed and to be immediately constructed, will afford a connection with the Georgia Pacific Railroad and the Kansas City Railroad at a distance of about 40 miles, which will enable us to reach the cheap Western markets for meat and grain, to be put down by our boats at the landings from which the cotton was taken, and it is an axiom of commerce in agricultural regions, that the point furnishing the supplies controls the trade. In a word, Tuscaloosa possesses all the advantages which belong to the towns of this rich mineral district in the way of raw materials, and, in addition, a healthy, well-drained location; a pure and abundant supply of water; a river navigable now more than seven months in the year (or longer than the Ohio from Pittsburgh down), and easily to be made navigable during all the year.

At this time, when the attention of the capitalists of all sections is centered on the rapidly developing South, I have thought it well to give this plain statement of facts concerning a town in which a great general interest is being manifested, and which I think will show that no point offers greater inducements to either investor or speculator.

Very respectfully,  
J. W. CASTLEMAN.

TUSCALOOSA, ALA., March 29, 1887.

#### National Association of Builders of the United States.

On the 6th of December last the Master Builders' Association of Boston, Mass., issued an invitation to various associations of a similar character in several larger cities of the country to assemble in the city of Boston on January 10, 11 and 12, 1887, for the purpose of discussing the feasibility of forming a national association, and to take steps to secure such an organization in event of the approval of the idea. Representatives accordingly met in Boston at the appointed time of master builders' exchanges, master carpenters' associations, master masons' associations, master painters' associations, contractors' and builders' associations, &c., from the cities of Albany, Baltimore, Chicago, Cincinnati, Detroit, New York, Philadelphia, St. Paul and Washington. At this meeting they adopted the following basis to secure a convention of the various industries interested in the construction and erection of buildings throughout the United States:

1. That a convention be called to meet in Chicago on the 20th, 30th and 31st of March, 1887.
2. That the name of the proposed association should be the National Master Builders' Association of the United States.
3. That the object of the association should be the establishment of uniformity and harmony of action in all matters that directly affect the interests of contractors, manual workmen, and all concerned in the erection of buildings in the United States.
4. That the basis of representation should be that each city having a population of not less than 50,000 shall be entitled to not more than seven delegates duly appointed by the master builders' association in each city, provided that the association shall represent a membership of not less than 50 firms, but in the absence of such an association the special building trades should be asked to unite in sending delegates.
5. That a tax of \$15 should be paid by each association gaining representation in the convention to defray expenses.
6. That authority for calling the convention should be vested in a committee of five.

Mr. W. H. Sayward was the chairman of the conference, and Messrs. L. H. McCammon and E. E. Scribner were secretaries. The committee of five, as appointed, consisted of Mr. George C. Prussing, of Chicago; Mr. J. Milton Blair, of Cincinnati; Mr. John S. Stevens, of Philadelphia; Mr. Thomas J. King, of Washington, and Mr. W. H. Sayward, of Boston.

In accordance with this preliminary action, the National Association of Master Builders met in Chicago last week, having their headquarters at the Grand Pacific Hotel. At the first business session, on Tuesday morning, there were 116 delegates present from 26 cities in 16 different States. The cities represented were Boston, Worcester, Providence, New York, Albany, Troy, Rochester, Buffalo, Philadelphia, Pittsburgh, Allegheny City, Baltimore, Charleston, New Orleans, Cincinnati, Columbus, Indianapolis, Chicago, Detroit, Grand Rapids, Milwaukee, Minneapolis, St. Paul, Sioux City, St. Louis and Nashville. Mr. George C. Prussing, of Chicago, was elected chairman; Wm. H. Sayward, of Boston, secretary; and J. Arthur Jacob, of Philadelphia, assistant secretary.

The following is the declaration of principles adopted:

This association affirms that absolute personal independence of the individual to work

or not work, to employ or not to employ is a fundamental principle which should never be questioned or assailed; that upon it depends the security of our whole social fabric and business prosperity, and that employers and workmen should be equally interested in its defense and preservation. While upholding this principle as an essential safeguard for all concerned, this association would appeal to employers in the building trades to recognize that there are many opportunities for good in associations of workmen, and while condemning and opposing improper action upon their part, they should aid and assist them in all just and honorable purposes. That while upon fundamental principles it would be useless to confer or arbitrate, there are still many points upon which conferences and arbitrations are perfectly right and proper, and that upon such points it is a manifest duty to take advantage of the opportunities afforded by associations to confer together to the end that strikes, lockouts and other disturbances may be prevented. When such conferences are entered into, care should be taken to state clearly in advance that this fundamental principle must be maintained, and that such conferences should only be competent to report results in the form of resolutions of recommendation to the individuals composing the various organizations participating, avoiding all forms of dictatorial authority.

That a uniform system of apprenticeship should be adopted by the various mechanical trades. That manual training schools should be established as a part of the public school system, and that trade night schools should be organized by the various local trade organizations for the benefit and improvement of apprentices. This association earnestly recommends all its affiliated associations to secure as soon as possible the adoption of a system of payment by the hour for all labor performed, other than piece work or salary work, and to obtain the co-operation of associations of workmen in this just and equitable arrangement. That all blank forms of contracts for buildings should be uniform throughout the United States. That such forms of contract, with the conditions thereof, should be such as will give the builder, as well as the owner, the protection of his rights, such as justice demands. That whenever a proper form has been approved by this association, after consultation with the American Institute of Architects and the Western Association of Architects, we recommend its use by every builder and contractor.

The Legislatures of the various States should be petitioned to formulate and adopt uniform lien laws, and every organization represented in this association is recommended to use its best endeavors to secure the passage of the same. Architects and builders should be required to adopt more effectual safeguards in buildings in process of construction, so as to lessen the danger of injury to workmen and others by properly covering the entire surface of open floors with rough boarding. We recommend the adoption of a system of insurance against injuries by accident to workmen in the employ of builders, wherein the employee may participate in the payment of premiums to the benefit of his employees; also in securing the payment of annuities to workmen who may become permanently disabled through injuries received by accidents or infirmities of old age.

#### The Boycott Illegal in Connecticut.

Judge Carpenter's Supreme Court opinion in the boycott case of the State against Glidden was agreed upon and handed to the court reporter, on the 1st inst. It defines the act of 1878, prohibiting threats of injury to property as including the boycott. The accused persons were convicted of conspiracy to boycott the proprietors of the New Haven Courier because they would not discharge non-union printers. "The question was," says the opinion, "Is this conspiracy illegal? Many acts are said to be unlawful which would not be the subject of a criminal conspiracy—other acts are unlawful because they are in violation of the criminal law or penal statute. If the ends or means are criminal in themselves, or contrary to some penal statute, the conspiracy is already an offense. The defendants and their associates said to the Carlington Publishing Company: 'You shall discharge the men you have in your employ, and you shall hereafter employ only such men as we shall name. It is true we have no interest in your business, we have no capital invested therein, we are in no wise responsible for its success, and we do not participate in its profits, yet we have a right to control its management and compel you to submit to our direction. The bare assertion of such a right is, said the court, startling. The two alleged rights cannot possibly coexist, one or the other must yield. If the defendants have the right which they claim, then all business enterprises are alike subject to their direction. No one is safe in engaging in business, for no one knows whether his business affairs are to be directed by intelligence or ignorance, whether law and justice will protect the business or brute force, regardless of law, will control it; for it must be remembered that the exercise of the power, if conceded, will by no means be confined to the matter of employing help. The exercise of irresponsible power by men, like the taste of human blood by tigers, creates an unappeasable appetite for more. Business men have a general understanding of their rights under the law and have some degree of confidence that the Government, through its courts, will be able to protect those rights. This confidence is the cornerstone of the whole business; but if their rights are such only as a secret and irresponsible organization is willing to concede to them, and will receive only such protection as such an organization is willing to give, where is that confidence which is essential to the prosperity of the country? Obviously such conflicting claims, in the absence of law, cannot lead to but one result and that will be determined by brute force. It would be an instance of the survival, not necessarily of the fittest, but of the strongest. That would be subversive

not only of all business but also of law and of the Government itself. The end would be anarchy pure and simple. No one can drive these non-union workmen from their situations—numbers if allowed their will may do it. The intention by one man which the law will take cognizance of, and so too of any number of men acting separately. But when several men form the intent and come together and agree to carry it into execution the case is changed. The agreement is a step in the direction of accomplishing the purpose. The combination becomes dangerous and subversive of the rights of others, and the law wisely says it is a crime. Justin McCarthy's definition of boycott is cited, but the court finds the intent of the boycotters in this country to be tempered by American institutions. Boycott does not mean murder, but it is criminal and dangerous, and if it is not abandoned the courts at no distant day will be called upon to recognize its dangerous tendency and treat it accordingly. From these considerations it is apparent that the purpose of conspiracy or the means by which it was to be accomplished or both were not only unlawful, but as some authorities express it, 'was in some degree criminal.'

#### WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., April 5, 1887.

The examination of designs for the new naval vessels, the prosecution of work on cruisers already under way, the completion of the armament and equipment of the cruisers afloat, the construction of the plant required to equip the ordnance foundry ordered to be established at the Washington Navy Yard, the scientific work of the Bureau and Boards in the testing of steel for ships ordered and being built, experiments in ordnance and its fabrication, the design of new guns and trials of various kinds and grades of ammunition, give the officers of the Navy on duty at the department an amount of work not known in naval circles since the close of the Rebellion. The Navy Department and the Naval Arsenal, which is now the official designation of the old Washington Navy Yard, will henceforth be the scene of stir and activity in all branches of the service, which will give an appearance of warlike preparation in the midst of peace, and will be a practical exemplification of the judicious counsel of the Father of his Country, "In time of peace, prepare for war."

#### THE NAVAL FOUNDRY.

The Secretary of the Navy, for some days, has been in counsel with the chiefs of the appropriate bureaus examining and discussing the plans prepared by the Naval Board for the plant proposed for the equipment of the Washington Navy Yard, under the order of some months ago converting it into a naval arsenal for the manufacture of naval ordnance, instead of being a yard of construction and manufacture of certain naval supplies. The ordnance officers of the department have been making their investigation of the proposed plans of the board in the line marked out by Secretary Whitney, and expect to report in the near future. The board plan contemplates a plant far beyond the immediate means or necessities of the work proposed, and will, therefore, doubtless be somewhat, if not materially modified. With the usual liberality of public affairs, the board proposed to demolish certain buildings and reconstruct new ones. Many of the buildings are old, but the Secretary proposes to utilize all that are not absolutely unfit for use, so as to keep up that portion of the appropriation remaining for machinery. The department officials are pressing their labors as much as possible, as many of the mechanical appliances, such as lathes and steam hammers required for finishing heavy ordnance are not made in this country, and will therefore have to be purchased abroad or be made at the foundry here, in either case requiring much loss of time. The officers specially detailed for this work think that it will require at least two years to get the plant in shape to manufacture the large caliber steel guns. The fabrication of guns of 6 inch caliber is now in progress. As the contract for the supply of gun steel for the heavier ordnance will not commence for 18 months or two years, every effort will be made to have the plant completed by that time.

#### PLANS FOR VESSELS OF WAR.

Plans were opened on the 1st for an armored cruiser and a powerful battle-ship under authority conferred by the act of August 3, 1886. Advertisements have been published by the Navy Department in American and European newspapers since August last inviting plans for these vessels. Plans were submitted by the following firms and persons: England—The Thames Iron Shipbuilding Company, London; the Barrow Shipbuilding Company; Mr. Watt, of Birkenhead. France—A. H. Grandjean, marine engineer, St. Nazaire. New Zealand—Capt. M. S. Clayton, Auckland. United States—Lieut. W. I. Chambers, U. S. N.; Chief Constructor T. D. Wilson, U. S. N. (Chief of Bureau of Construction); Constructor S. H. Pook, U. S. N.; N. L. Tonns, New York City, and F. L. Norton, of Washington. The Thames Shipbuilding Company offered designs for both battle ship and armored cruiser. This company built the formidable Benbow and Superb, of 10,000 and 9000 tons respectively, and is now engaged on the Sanspareil, all for the British Admiralty. They have also built the Koenig Wilhelm, of 7000 tons, for Germany in 1868 and the Mesodich for Turkey in 1874 (9000 tons). As far back as 1860 they built the ironclad Warrior for England, and almost every year since has witnessed a new production, both armored and unarmored. The Barrow Shipbuilding Company, of Barrow, in Furness, also offered a design for both battle-ship and armored cruiser. This company constructed the torpedo cruiser Fearless, about 1700 tons, which developed a very high speed and great offensive power. The plan of battle-ship offered by them presents a feature somewhat remarkable

able of having the water line well protected by heavy armor, and also the guns on the upper deck, but of leaving the intermediate space between the upper and lower decks wholly without protection, there being nothing there of importance, and the buoyancy of the ship being well assured by a defective deck at the top of the water-line armor. This plan has been embodied in some of the enormous vessels recently built for the Italian navy, and has given rise to much discussion in professional circles. There are two turrets, en echelon—that is to say, not in the middle line of the ship, but somewhat out to the side, so that their guns can fire directly forward and directly aft. The naval architects of the United States were well represented, as well by the quality as the number of plans furnished. The plans from New Zealand included but a rough tracing, representing some special ideas of the designer, who is Lloyds' surveyor at Auckland.

There was some disappointment in the department on account of the absence of designs from several of the celebrated shipbuilding establishments and naval engineers of France and Germany. This was expected from advices received several months ago. The inference is that press of business prevented.

The designs will now be carefully examined by a board of naval officers. The only foreign ones of sufficient compliance with the requirements of the department are those from England. Those of home preparation come from the Navy.

#### The Iron and Steel Production of France.

The following statement shows the French production of iron and steel during the year, compared with that of 1885, in detail:

Pig Iron.			
	1886.	1885.	Totals.
Forge pig.....	1,335,364	850,100	1,565,464
Coke pig.....	41,710	7,405	29,115
Mixed brands.....	16,069	16,069	16,069
Totals.....	1,393,143	873,574	1,680,618

Manufactured Iron.			
	1886.	1885.	Totals.
Coke pig.....	1,188,665	298,809	1,480,914
Charcoal pig.....	7,508	4,327	18,285
Mixed brands.....	6,551	6,551	6,551
Totals.....	1,196,523	311,287	1,507,850
Difference for '86	60,511	62,287	124,798

Merchant Steel.			
	1886.	1885.	Totals.
Puddled iron.....	4,479	556,525	102,166
Charcoal iron.....	17,666	6,830	24,496
By reheating.....	84,811	9,758	94,525
Totals.....	4,735	659,092	118,694

Merchant Steel.			
	1886.	1885.	Totals.
Puddled iron.....	910	569,109	88,485
Charcoal iron.....	13,587	4,241	17,708
By reheating.....	82,972	7,970	90,942
Totals.....	910	665,608	100,696

Difference for 1886—8,225 +6,906—17,998—13,217

The above statement shows a great decrease in the production of pig iron and steel rails. On the other hand, the output of merchant descriptions of steel and of steel plates has greatly increased, the growth in merchant steel amounting to 10 per cent. Nevertheless, there is a diminution in the total output of steel to the extent of 17 per cent.

The Moore-Benjamin Company, largely interested in the Gogebic range, have printed a neat pamphlet describing the property of the Aurora Mining Company, who control the Aurora, one of the famous mines of that district, which is expected to produce 200,000 tons of ore during the current year. In this report the following estimate is made of the cost of putting ore into the markets in the case of the Gogebic and Marquette districts:

	Gogebic.	Marquette.
Mining and delivery on cars.....	\$0.75	\$2.25
Rail to shipping port.....	.70	.85
Vessel to Cleveland.....	1.90	1.90
Commission and insurance.....	.15	.15
Royalty.....	.50	....
Total cost.....	\$4.00	\$4.65
Selling value, Cleveland.....	6.00	6.50
Profit.....	\$2.00	\$1.85

Such a statement, naturally very general, is open to considerable criticism. It may well be questioned whether any mine can realize on a whole year's shipment anything like the prices named, since only a part of its product is of the highest grade, and since thus far the markets have not recorded values as large as those stated for the class of ores produced.

All the scale proposals of the Amalgamated Association of Iron and Steel Workers have been voted on, and as soon as they can be printed will be sent out to the lodges for their guidance in instructing delegates to the annual scale convention in June. The Pittsburgh lodges all favor an advance in the scale to \$5.50 per ton for boiling, while a few advocate \$6. Many puddlers advocate the changing of the basis of the selling price from bar iron to muck bar or finished iron. The more conservative element contend, however, that such a change is impracticable and unwise.



# Trade Report.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, April 6, 1887.

**Scotch Pig.**—The market is not so steady. Scotch Warrants closing 41/6 1/2 @ 41/7. Makers' brands are quoted as under:

Coltness, alongside, Glasgow	41/6
Langhorne, " " " "	41/6
Glenartney, " " " "	41/6
Gartshore, " " " "	41/6
Shotts, " " " "	41/6
Dalmellington, " " " "	41/6
Carnbroe, " " " "	41/6
Edlington, " " " "	41/6
Summerlee, " " " "	41/6
Carriage from Ardrossan to Glasgow is 1/2 ton.	

**Bessemer Pig.**—The market is not so steady. We quote W. C. Hematites, Nos. 1, 2 and 3, 44/6 @ 46/6.

**Cleveland Pig.**—The market is irregular, with closing quotations at 38/ for No. 1 Foundry; 37/ for No. 2; 36/ @ 36/3 for No. 3, and 35/6 for No. 4 Forge.

**Bessemer Billets.**—Bessemer Billets, 4 x 4 inches are 80/ @ 85/.

**Bessemer Blooms.**—The market is irregular. We quote Blooms, 7 x 7 inches, 77/6.

**Bessemer Crop Ends.**—We quote run of mill 51/ @ 53/.

**Manufactured Iron.**—The market is irregular. We quote:

Staff, Ord. Marked Bars	6 10 0 66	6 10 0	6 10 0
" " Common	4 15 0 66	5 5 0	5 5 0
Hoops, 20 W. G. and over	6 0 0 66	6 10 0	6 10 0
" " Common Best	5 10 0 66	6 0 0	6 0 0
" " Medium	5 0 0 66	5 2 0	5 2 0
Sheets, 20 W. G. and under	6 15 0 66	7 5 0	7 5 0
" " Ordinary Best	6 0 0 66	6 5 0	6 5 0
" " Common	6 0 0 66	6 5 0	6 5 0

Welsh Bars are quoted £4. 17/6.

**Steel Rails.**—The market is unchanged, prices remaining £4. 5/ @ £4. 10/.

**Old Rails.**—The market is quiet and irregular, with small offerings and few sales. Prices are nominally 60/ @ 62/6, for T's, c.i.f. New York, and 60/ @ 65/ for Double Heads.

**Scrap.**—With an irregular market, quotations are at the close 55/ @ 57/6, c.i.f. New York for Heavy Wrought Scrap.

**Copper.**—The market is unchanged, Chili Bars closing £39. 10/ @ £39. 15/, and Best Selected, £44 @ £44. 10/.

**Tin.**—The market is unchanged, spot closing £102 @ £102. 5/ and futures £102. 10/ @ £103.

**Tin Plates.**—Tin Plates are a little steadier. We quote:

Tin Plates, 10x14, 1st qual. Charcoal	17/ @ 18/
" " " " " "	15/ @ 16/
" " " " " "	13/ @ 14/
" " " " " "	12/ @ 13/

**Spelter.**—The market is a little weaker. We quote £14 @ £14. 2/6.

**Lead.**—We quote £12. 15/ for Common English Pig.

**Freights.**—Steam freights from Glasgow to New York are 6/6 @ 7/6, and from Liverpool to New York, 6/6 @ 7/.

## Financial.

Office of The Iron Age,  
WEDNESDAY EVENING, April 6, 1887.

The absorbing topic of the week relates to the practical operation of the Interstate Commerce law as affecting business interests. Merchants in many interests are much perplexed pending the solution of various questions arising therefrom, and for the present the new law must operate as a retarding influence. The commissioners at once made Judge Cooley president, on motion of Colonel Morrison, and proceeded to act informally upon the business already awaiting their consideration. It was regarded as significant that the first commercial organization to ask for at least a temporary suspension of the operation of the law was the Atlanta Chamber of Commerce, assigning as a reason that "the measure will result unfavorably to manufacturers in the South by tolerating low rates on Northern goods sent South while permitting full rates on Southern goods sent North." With rare exceptions the railroad companies were in readiness for the change imposed by the law, and on Tuesday the new tariffs were posted in the principal offices. On the same day the Interstate Commerce Commission promulgated the following rule of proceeding: "Applications made for the official action of the Commission shall be made by petition, which shall set forth the facts on which they are founded, and be verified by the oath of the applicant or of some authorized agent or attorney."

New York merchants, as a rule, seem to be of the opinion that a quiet market will prevail for some days to come, chiefly for the reason that merchandise in large quantities has been forwarded in anticipation of actual wants. One feature new to the situation is the pressure of freight offered via the Isthmus, as a consequence of an advance in transcontinental rates. Pittsburgh notices with concern a heavy advance in rates to the Pacific, which the glass manufacturers expect will wholly exclude them from the California trade, while New York and New Jersey manufacturers, who are near the seaports, will enjoy the advantage. The commis-

sion, in passing upon important questions awaiting their decision, would have it understood that in the most pressing cases temporary decrees will be issued until the matters involved can be more fully investigated. So far as can be seen the general effect of the act is an increase in the cost of transportation in the effort to equalize the long and short haul charges; otherwise stated, the change is in the direction of lower charges on local traffic and higher on the long, through traffic, the latter comprising the great bulk of the freight carried.

On the Stock Exchange the market has been strong and higher. The coal stocks advanced on higher tolls and other stock have been strengthened by London buying. Both on Friday and Saturday the tone was bullish. Louisville and Nashville, Reading, Jersey Central, and Lake Shore were all prominent, and on Monday these stocks were further advanced. On Tuesday there was more selling and the market was irregular. To-day Union Pacific and Pacific Mail were exceptionally strong on account of advanced rates for transportation, but there were several conspicuous declines.

United States bonds closed as follows:

U. S. 3 per cents	100 66
4 1/2s, 1891, coupon	107 1/2 110
4 1/2s, 1897, coupon	128 1/2 129 1/2
U. S. Currency 6s, 1890	128 1/2 129
U. S. Currency 6s, 1891	129 1/2 130
U. S. Currency 6s, 1892	131 1/2 132
U. S. Currency 6s, 1893	133 1/2 134
U. S. Currency 6s, 1894	135 1/2 136

To-day 60-day sterling bills were advanced 1/2d. per £ to 4/86.

In the review of the week business has suffered from weather conditions which have made transportation difficult, but even with this abatement the volume of transactions has been large. Clearances of 35 cities show an increase of 11.5%, compared with 1886; New York gained 7.3%. Outside of New York the clearances show a gain of 20.9%. The clearances for March of 35 cities were \$4,474,258,209; increase 7.1%; for the first quarter of the year, \$12,479,412,483, an increase of 2.5%. No new movement of importance will be looked for before the opening of the water routes.

The weekly bank statement afforded a better showing than was expected after the heavy drain of currency to interior points lately noticed. The decrease in surplus reserve was \$1,807,025, which leaves the banks with \$4,379,525 above the 2% legal requirements, as compared with \$11,991,400 in 1886, \$47,123,850 in 1885 and \$4,203,875 in 1884. In loans there was an expansion of \$256,700. According to the Custom House report the exports of specie from this port last week were \$714,892, making a total since January 1 of \$6,616,621, compared with \$20,962,000 for the corresponding months last year, and the imports were \$122,272, making a total of \$4,228,909 since January 1, against \$5,047,669 for the same time in 1886.

The imports at this port last week were valued at \$8,799,448, of which \$2,320,000 represents dry goods, making the total since January 1 \$116,860,000, against \$111,908,000 for the same time last year, and \$103,409,000 in 1885. The exports are \$2,000,000 above the previous week, the valuation being \$7,000,000, making the total since January 1 \$77,544,752, against \$77,969,684 for the same time last year and \$90,875,074 in 1885. The items include 142,491 barrels flour, 1,660,843 bushels wheat, 449,031 bushels corn, 29,393 bales cotton, 7,049,869 gallons petroleum, 4,783,893 pounds cut meats.

The business failures of the three months ending the 31st ult., as reported by R. G. Dunn & Co., numbered 3007, against 3203 for the same quarter of 1886. The comparative liabilities for the corresponding periods were: 1887, \$32,161,000; 1886, \$29,681,000. The geographical distribution is somewhat unusual, the liabilities in the Middle States amounting to \$12,000,000, showing an increase of over \$6,000,000 compared with 1886; and in New York City they were \$5,000,000, against \$2,700,000 last year. In all other sections of the country except the Middle States the failures are fewer and much less in amount than an average, and the total result is much less than in previous years. In Canada the failures for the first quarter of 1887 are slightly in excess compared with 1886.

The reduction of the public debt during the month of March is estimated to have been about \$12,000,000. The receipts of the Treasury amounted to about \$34,000,000 and the expenditures to \$19,000,000, leaving an excess in receipts of some \$15,000,000. At this rate the question as to what shall be done with the surplus will soon become more urgent.

The tendency of money is easier. Call loans average about 6%. Little is being done in commercial paper, and rates are nominal at 6%, 60 or 90 days; longer dates, 6 1/2% or 8%. Money is firm in Western centers. Foreign exchange is dull, but steady. Bar silver is down to 43 1/2d. in London. The redemption of trade dollars thus far only amounts to \$3,875,000. The bill appropriating \$550,000 for enlarging the canal locks became a law without the Governor's signature. In general trade there is a fair degree of activity. Shipments east from Chicago during the week comprised \$1,220,000, against 74,456 during the previous week. Wheat is dull and lower; export demand light. Cotton is dull. Hides and leather are quiet. Petroleum steady; export trading moderate. Lard dull and lower. Pork in light demand. In ocean freights there are light offerings.

The Supreme Court of the United States confirmed the decision of the Circuit Court that the national banks must pay the taxes imposed on them in New York for local purposes, which for the current year amount to about \$1,250,000.

## NEW YORK.

There is still, as we write, considerable uncertainty as to the rates of freight. In the majority of cases rates have been named which are above those previously paid; in other instances they are lower, and in a few isolated cases rates already named have been again revoked. The current week will probably bring order out of chaos.

**American Pig.**—The market continues very dull, with only a small business and very light offerings. Some Southern No. 1 Mill is being offered, and the last of a lot of Southern Charcoal Iron held on speculation has been placed during the current week. We quote nominally \$21 @ \$21.50 for No. 1 Foundry, \$19.75 @ \$20.50 for No. 2 Foundry, and \$18.50 @ \$19 for Gray Forge in round lots.

**Scotch Pig.**—The market is dull and quiet. We quote for round lots, to arrive: Coltness, \$22.50 @ \$22.75; Glenartney, \$22 @ \$22.50; Shotts, \$22.25 @ \$22.50; Carnbroe, \$21.75 @ \$22; Clyde, \$21 @ \$21.25; Summerlee, \$22 @ \$22.25; Dalmellington, \$20.75 @ \$21; and Edlington, \$20.50 @ \$20.75.

**Bessemer Pig.**—The market is dull, with only one inquiry for 6000 tons pending, and some demand for special grades. We quote Foreign \$20.50 @ \$21.

**Spiegel Eisen.**—The only sale reported is that of one lot of 3000 tons of 22% to an Eastern Pennsylvania mill at private terms. We quote: \$27.50 @ \$27.75 for 20%.

**Bar Iron.**—There is very little new business, and more pressure to sell, notably Common Iron. It is reported that there are quite a number of inquiries in the market which may be closed at an early date. We quote Common, 1.95¢ @ 2.10¢; Medium, 2.10¢ @ 2.20¢, and Refined, 2.20¢ @ 2.50¢, in round lots on dock.

**Structural Iron.**—Some round lots have been placed during the week, among them one lot of 600 tons of Beams for a new building. We note also the closing of a contract for a bridge in the West calling for 3000 tons, taken by an Eastern bridge works, with other large amounts both East and West pending. There is considerable work in sight in this immediate vicinity, among which we may note about 5000 tons for the Jersey City Junction Company, the elevated for the Pennsylvania road in Jersey City, the extension of the suburban elevated road in this city, the 22d armory, and other buildings. During the week three new stations for elevated road was awarded to the Wallis Iron Company. We quote according to quality, for Angles, 2.35¢ @ 2.50¢, delivered, and Tees at 2.75¢ @ 3¢, round lots. Store quotations remain 2.75¢ @ 2.85¢ for Angles and 3¢ for Tees. American Beams and Angles are 3.3¢ base for all orders.

**Plates.**—We quote for round lots: Common or Tank, 2.35¢ @ 2.50¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.7¢ @ 2.8¢; Flange, 3.7¢ @ 3.8¢. Flange, Extra, 4 1/4¢ @ 4 1/2¢. For small lots of Steel Plates quotations are as follows: Tank, 2.85¢ @ 3¢; Ship, 3¢; Shell, 3.25¢ @ 3.50¢; Flange, 3.60¢ @ 3.75¢, and Fire-Box, 4.35¢ @ 4 1/2¢, on dock.

**Steel Rails.**—The Eastern markets are very quiet, and as yet the lots held by speculators have not been all closed out. A sale of 2000 tons of Foreign Rails is reported for delivery at New Orleans at \$41.25, and it is rumored that representatives of English works are offering Rails delivered at Lake ports at a shade under the prices of American mills. In the West some round sales are reported, among them one lot of about 10,000 tons by an Illinois mill. We quote nominally \$39 @ \$40.

**Blooms.**—The market is dull at nominally \$30.

**Billets and Slabs.**—There is some inquiry, but little business has been done. We quote nominally \$31.75 @ \$32. Nail Slabs are offered at \$31.

**Wire Rods.**—The market is steady and quiet, with quotations at \$42, which can be shaded slightly.

**Old Rails.**—Not a single sale of any consequence is reported, although offerings of round blocks of Foreign Rails in port, all at and for shipment continue to be made at low figures. Among the lots offered is one of 5000 tons at a French port. Thus far a remarkably small quantity of American Rails have come into the open markets, and this is pointed to by many as the only good feature in the market. We quote nominally \$22.50 for Foreign Double Sheets, and \$22 @ \$22.50 for T's.

**Scrap Iron.**—The market is very dull, with Yard Scrap at \$24 @ \$24.50, or above buyers' views, and Foreign, for shipment, \$22 @ \$22.50, with no inquiry.

**Leaf Spring Steel.**—A considerable quantity has been bought direct in England by an Eastern Crucible Steel manufacturer.

**Rail Fastenings.**—We quote Spikes 2.50¢ @ 2.70¢, delivered; Angle Fish Bars, 2.20¢ @ 2.25¢; Bolts and Nuts, 3.15¢ @ 3.20¢, and Bolts and Hexagon Nuts, 3.30¢ @ 3.40¢.

Mr. Chester Griswold has retired from the presidency of the Troy Steel and Iron Company. Mr. H. H. Rogers, who is connected prominently with the Standard Oil Company, has been elected president, and Mr. W. Knap, vice-president.

R. B. Houghton, agent of the Sanderson Bros. Steel Company, of 39 Fort Hill square, Boston, Mass., has issued the following circular, under date of March 30: "A large part of our works at Syracuse, N. Y., were destroyed by fire March 30. We shall begin rebuilding at once on a larger scale, and within 60 days shall be at work with greatly increased capacity and improved facilities. In the meantime, from our large stock in store here, and by working up the Ingots and Billets saved in great quantity from the fire, we hope to meet all ordinary demands from our customers without serious interruption. Asking your indulgence for any unavoidable delay that may occur in filling orders for special sizes or kinds of steel."

A decision has been rendered by the Custom authorities in Boston concerning the duty on Iron Rods. Charcoal being used in their manufacture as a fuel the duty has been \$22; now, under another clause, it is again made 0.6¢ per lb., which it was formerly.

## Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, April 5, 1887.

The fourth month of the year has been reached without bringing with it any decided change in the market, and the situation is almost as uncertain as it was three or four months ago. Consumption has been very large, and prices have been held at higher limits than have been known for several years, but production has been increased to such an enormous extent that there is considerable doubt whether the market can stand the strain for any great length of time. So far there are no indications of accumulation, and the outlook is in all respects healthy, but it is impossible to predict with any degree of certainty what the course of prices will be. The general impression is that there will not be much change either way, although, if the demand is what most people expect it to be, the chances are in favor of somewhat higher prices. All that is required is a start, which, when once realized, would be very likely to carry prices higher than they have yet been. And, on the other hand, if the demand does not improve within the next couple of weeks, it will be difficult to hold prices at present limits, small as the offerings may be. The chances, however, are in the other direction, because consumers are all busy, with prospects for the near future quite as favorable as they have yet been. The general complaint is that prices are too low, not that business is scarce. There are several influences that tend to interfere with a renewal of activity, chief of which is the irregularity in freights, and until this matter is adjusted, it will be useless to expect any general resumption of activity.

**Pig Iron.**—Business during the week has been very disappointing. Large buyers have made inquiries for quotations, and in some cases comparatively low prices were named, but without meeting with general acceptance. The fact is, there is an unwillingness to buy far ahead, even if prices are made as low as the most exacting buyer could expect, simply because they are uncertain what shape things may take a few weeks later on. The consequence is that business is confined to covering immediate requirements, and as consumption and production are about equal there is neither scarcity nor surplus to give definite character to prices one way or another. It is hardly likely that this state of affairs can continue for any length of time, but there is an evident determination on both sides to wait for developments, and to take the market on its merits—if it is going lower, let it go; if higher, go with it. Meanwhile standard brands are held at about \$21.50 at tide for No. 1 Foundry, \$20 for No. 2, and \$19 for Gray Forge; some get a little more, but as a rule there are fair average prices. Outside brands can be had at less money, say 50¢ @ 75¢ per ton less, but they are not wanted, although offered with a good deal of urgency, so as to make an opening for future transactions. Proposals for 5000-ton lots of standard makes have been met with offers of concessions of about 25¢ per ton, but were not accepted, the parties preferring to risk their chances of buying on better terms later on, consequently sales have nearly all been small lots for prompt delivery at prices above named.

**Foreign Iron.**—There is no business to report, although there are inquiries for both Bessemer and Spiegel in lots of 1000 to 3000 tons each. Asking prices same as last week, say \$20.50 @ \$20.75 for Bessemer and \$27.50 @ \$28 for 20% Spiegel, c.i.f., duty paid.

**Blooms.**—Market extremely dull, and prices all more or less nominal. Asking prices about as follows (although concessions could probably be had on offers of good-sized lots): Rail Blooms for shipment, \$29.50 @ \$30.50; Nail Slabs, \$31 @ \$32; Sheet-Iron Billets, \$34 @ \$36; higher qualities for Boiler Plate, &c., \$38 @ \$44. American Blooms as follows: Charcoal Blooms, \$55 @ \$56; Runout Anthracite, \$47 @ \$48; Scrap Blooms, \$38 @ \$39, and Ore Blooms, \$36.50 @ \$37 1/2 "bloom" ton.

**Muck Bars.**—The offerings are larger, and prices not as firm as they were a week ago. Sales chiefly at about \$33.50 at mill,

although some quote higher on near-by deliveries, while others at a distance would shade \$33.50.

**Bar Iron.**—The demand is just about fair, nothing active, yet no absolute scarcity of orders. Those who want better prices find it impossible to do anything, and not a few find it hard to sell at quoted rates, while some have shaded a trifle so as to secure immediate orders. On the whole, the position may be called unchanged, although there is a very hopeful feeling in regard to the future, which, if realized, will probably stiffen up prices to where they were six or eight weeks ago. Meanwhile the market is rather irregular, with sales at from 2.15¢ to 2.1¢ at mill for Best Refined Bars (2.3¢ from store), and 2¢ @ 2.1¢ for Medium quality of Bars. Skelp Iron is in fair demand, but slightly easier at about 2.2¢ for Grooved Skelp, and 2.4¢ @ 2.5¢ for Sheared. Manufacturers are beginning to feel the effects of the Interstate bill in a higher cost of production, and there is quite a probability of better prices being demanded as a defensive measure.

**Plate and Tank Iron.**—The general attitude is still one of expectancy. New business has not come in as promptly as was expected, but it is still in sight and will come sooner or later. Some of the mills are a little anxious for work, and in order to get something to go on with are willing to quote comparatively low figures, but as a rule, quoted rates are pretty well adhered to, with prospects of still better prices if the demand is at all in proportion to expectations. Meanwhile quotations are about as follows: Ordinary Plate, 2.4¢ @ 2.45¢, delivered; Tank, 2.5¢; Shell, 2.75¢ @ 2.85¢; Flange, 3.75¢; Fire-Box, 4.75¢; Steel Plates, Tank, 2.9¢ @ 3¢; Shell, 3.25¢; Flange, 3.5¢; Fire-Box 4¢ @ 4.5¢.

**Structural Iron.**—The market is quiet and without any special feature, although there is a very large amount of business under negotiation, nearly all of which is likely to be closed in a short time. The mills are amply employed in the meantime, and prices are well maintained at about last week's prices, say, 2.5¢ for Bridge Plate, 2.30¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

**Sheet Iron.**—The demand is fair, and for some specialties has been very good, although prices have been very irregular, and for grades rather lower. For good makes, small lots, prices remain about as follows:

Best Refined, Nos. 26, 27 and 28	4 1/2
Best Refined, Nos. 18 to 25	3 1/2
Common, 1/2¢ less than the above	
Best Bloom Sheets, Nos. 26 to 28	4 1/4 @ 5
Best Bloom Sheets, Nos. 25 to 26	4 1/4 @ 4 1/2
Best Bloom Sheets, Nos. 16 to 21	3 1/4 @ 4
Blue Annealed	3
Best Bloom, Galvanized, discount	10
Common discount	15

**Steel Rails.**—The market is dull and unchanged, freight matters being a source of difficulty to nearly all the mills. Prices are steady, however, with \$39 at mill as a very inside price, and \$39.50 @ \$40 usually quoted for early deliveries. Mills full of work, so that there is no pressure to sell.

**Old Rails.**—The market is very weak, and prices decidedly lower, both for shipments and spot lots. A small lot of T's sold at \$23.50, spot, but they are now offered at \$23, spot, and \$22 for shipments. A lot of D. H.'s, spot, sold at about \$22.25, with shipments offered at \$23 without finding buyers.

**Scrap Iron.**—Market irregular, but good qualities are not plenty, and would command full prices; others dull and neglected. Quotations are about as follows: Cargoes of No. 1 Scrap, \$22 to \$23; small lots, tide-water delivery, \$23.50; Selected do., \$24 @ \$24.50; No. 2 do., \$16 @ \$17; Turnings, \$15 @ \$16.50; Old Car Wheels, \$17 @ \$17.50; Old Steel Rails, \$23 @ \$24; Cast Scrap, \$16 @ \$17, do. Borings, \$12 @ \$13; Old Fish Plates, \$26 @ \$28.

**Wrought Iron Pipe.**—During the week a large amount of business has been transacted, and the feeling in regard to the future is very hopeful. The recent advance in list prices is being fully maintained. Quotations remain as last quoted, viz.: Lap Welded Black, 50¢; Lap Welded Galvanized, 32 1/2¢; Butt Welded Black, 32 1/2¢; Butt Welded Galvanized, 22 1/2¢; Boiler Tubes, 42 1/2¢.

**Nails.**—With the improved condition of the weather a better demand is noticeable. Price is held with a fair degree of firmness at \$2.60 for lots from store.

## Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, April 4, 1887.

**Pig Iron.**—The tendency to lower prices seems to have been checked, a buying movement having set in during the past week which promises to be sustained. No large sales are reported, but an increasing volume of small sales is in progress, which gives a very healthy tone to the market. Among the buyers of the past week were a number of large consumers who had supposed their contracts for Pig Iron would carry them through the season, and probably leave a little stock on hand. Other buyers of the same class are making inquiries, prompted by their rapidly disappearing stocks. A demand for Bessemer Pig is also springing up to supply new establishments, and orders for Iron of this character are expected soon.



## Trade Report.

to be placed, covering a considerable quantity. New rates of freights have been announced on a number of railroads, but they differ very little from old rates, so that the market is not so much disturbed on this account as had been feared. Buyers who can do so will probably wait now for the opening of navigation to place their order in the hope that water rates will be lower than rail rates, and that they will get the advantage of the difference. This policy will be all right if, in the meantime, the price of iron does not advance. An attempt will be made by furnace agents to keep prices steady at present quotations, but this may be an impossibility if the buying movement now in progress becomes very much heavier. Cash quotations are as follows: time rates 50¢ per ton higher: Lake Superior Charcoal, Nos. 1, 2 and 3, \$23.50 @ \$24; Blackband Coke Softeners, \$23.50 @ \$24; Hanging Rock and Jackson County Soft, \$22.50; Straight Coke Foundry No. 1, \$22.50 @ \$23; No. 2, \$21 @ \$21.50; No. 3, \$20 @ \$20.50; Coke Bessemer, run of furnace, \$23.

**Bar Iron.**—Early last week there was some pressure for orders by certain mills, and prices were cut slightly, but later a better feeling set in, as it was found that business could be secured with ease. Orders are not at all scarce, and it appears singular that prices are not strictly adhered to under the circumstances. Quotations for carload lots range from 2.1¢ to 2.25¢, on cars at Chicago, subject to slight modification for a liberal sprinkling of extras. Store prices can be quoted at 2.25¢ @ 2.4¢, according to quantity and quality.

**Structural Iron.**—Some large orders have recently been placed for bridgework, as well as for Beams for buildings. Other large orders in both lines will soon be on the market, and the prospects are favorable for a very busy season if the local labor troubles in the building trades are speedily settled. Shapes are quoted as follows: Beams and Channels, 3.8¢ from store; Angles, 2.8¢ @ 3¢ from store, and 2.6¢ on cars from mill; Tees, 3.25¢ from store; Universal Mill Plates, 2.7¢ on cars from mill. A large sale of Car Axles (Scrap) was made at 2.45¢ on cars from mill.

**Plates.**—The demand from small consumers keeps up very well. Prices from store are as follows: Iron Tank, 2.8¢; Shell, 3.25¢; Flange, 4.25¢; Steel Shell, 3.5¢; Flange, 4.25¢; Fire-box, 4.75¢.

**Sheet Iron.**—Trade is quiet at present. Common Black Sheets are quoted as follows, in carload lots, Chicago, usual terms: No. 27, 3.2¢; Nos. 22 to 24, 3¢; Nos. 15 to 17, 2.75¢; Nos. 10 to 14, 2.65¢. From store jobbers quote 3.4¢ for No. 27, 3.3¢ for Nos. 25 and 26, and 3.2¢ for No. 24.

**Galvanized Iron.**—The Manufacturers' agents report the trade of the month just closed as the largest they have ever had. Old orders have now been pretty well filled, and new orders are being placed at firm figures. Agents quote to jobbers 62½¢ discount for Juniata and 62½¢ and 5¢ for Charcoal, while jobbers quote 50¢ and 15¢ for Juniata and 60¢ for Charcoal.

**Merchant Steel.**—Some little inquiry is noted for Syndicate Plow Steels at the higher prices recently established. A steady business is being done in other lines. Quotations continue as follows: Ordinary Tool Steels, 8¢ @ 8.5¢; Specials, 13¢ @ 20¢; Spring, 3¢ @ 4¢; Sheet, 7¢ @ 11¢; Bessemer and Open-Hearth Machinery, 3.1¢ @ 3.25¢.

**Steel Rails.**—Very little new business is reported, but inquiries are noted for round lots of 35-lb Rails for narrow-gauge roads. Prices of standard sections can be quoted at \$42 at works for late fall delivery.

**Old Rails and Wheels.**—Nothing has been done in these classes of Old Material, as far as can be ascertained. Consumers are pretty well stocked for the present, and dealers have no accumulations which they are anxious to force on the market. Rails can be quoted at \$27 @ \$27.50, delivered at points of consumption, and Wheels at \$21.50 @ \$22.

**Scrap.**—Very little business is being done in this line at present. Prices are so weak that dealers are afraid to lay in much stock, although a great deal is being offered by the railroad companies. A single company is asking for bids on over 2000 tons of Old Material. Local dealers are unfavorably affected in two ways, first by the steady decline in prices, and second by an advance in freights. Nominal selling prices are as follows, per ton of 2000 lb: Railroad Shop or No. 1 Forge, \$23 @ \$24; Railroad Track, \$21 @ \$22; Mill or No. 1 Wrought, \$19; Light or No. 2 Wrought, \$12; Boiler Plates, \$18; Stove Plate, \$10; Machinery Cast, \$16 @ \$17; Cast Borings, \$10.50; Machine Turnings, \$13; Axle Turnings, \$15.50; Coil Steel, \$18; Leaf Steel, \$20; Locomotive Tires, \$20; Horseshoes, \$22; Axles, \$28 @ \$30.

**Nails.**—Trade has fairly opened for the season, the retailers stocking up quite generally, but consumption has hardly started yet, so that a really brisk movement is for the future to develop. Local prices are lower. Jobbers' quotations are \$2.60 for

Iron and \$2.75 for Steel, with 10¢ off for carload lots, but buyers have no difficulty in placing orders at \$2.50 for carload lots of Steel, with a corresponding reduction for Iron. So far as known there is no weakness among manufacturers, the decline in prices being entirely due to speculative stocks carried by jobbers and others.

**Barb Wire.**—In sympathy with the weakness in Nails the price of Barb Wire has receded a little, small lots having been sold during the past week as low as 3.6¢ for Painted, and 4.35¢ for Galvanized. The demand for Barb Wire is better proportionately than that for Nails. All the Barb Wire factories are behind in filling their orders, while the Nail factories are reported to be accumulating stocks. The Board of Directors of the United Wire Company held a meeting in this city on the 30th ult., at which satisfactory progress was made toward completing the pooling arrangement.

**Hardware.**—Jobbers have been so pressed with orders for some time past that the largest houses have been obliged to work their clerical force into the night to get out goods. There is no material change in prices.

Mr. S. H. Fernandez will open an office on the 15th inst. in Room 53, at 115 Dearborn street, Chicago, representing Messrs. Matthew Addy & Co., Pig Iron merchants, of Cincinnati, Ohio. Mr. Fernandez has been located temporarily at 95 Dearborn street.

Mr. Geo. G. Spencer has been appointed resident agent at Chicago of the Laughlin Nail Company, of Wheeling, W. Va., and the Aetna Iron and Steel Company, of Bridgeport, Ohio. His office will be located at 130 Lake street. Mr. Spencer is well and favorably known in the Chicago Iron market, having been associated for some time with Mr. F. K. Bowes.

Mr. H. A. Warren has established at 115 Dearborn street, Chicago, rooms 20, 21 and 22, a branch office of Messrs. Dalliba, Hussey & Co., Iron Ore and Pig Iron dealers, of Cleveland, Ohio.

Mr. Albert L. Butler, manager of the Western branch of Messrs. Miller, Metcalf & Parkin, Crescent Steel Works, Pittsburgh, will remove on the 11th inst. from 22 and 24 West Lake street to 64 and 66 South Clinton street, Chicago. The firm purchased the building at the latter location, and have removed it to suit their purposes as an office and warehouse.

Messrs M. A. Mihills & Co. are a new firm just launched in the Chicago Iron trade at 130 Lake street. They start under very flattering auspices, representing direct the Salem Wire Nail Company, Wm. Scholhorn & Co., Mack & Co., L. S. Starrett, Sterling Wrench Company, Snell Mfg. Company, &c. They will also handle Iron and Steel Bars, Sheets, Plates, &c., and Wheeling Steel Nails. The firm is composed of Mr. M. A. Mihills and Mr. Geo. G. Spencer.

## Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., April 5, 1887.

The general Iron and Steel business has undergone no important change during the past week. Trade in all kinds of the raw articles continues slow, but there appears to be no abatement in the demand for the products. It is expected that there will be an increased demand before the close of the present month. The reports from the South and West continue of a favorable character, and the indications are that there will be a good demand all summer not only for Iron and Steel, but for all kinds of manufactured goods.

**Pig Iron.**—There is not the activity there was during January and the early part of February. Consumers, as a rule, have for some time past been buying only as their immediate necessities required, and as a consequence they are getting low in stock. For the time being the market is slow, but for standard brands of both Mill and Foundry there is no disposition to make further concessions in order to effect sales. Furnacemen say that under the most favorable circumstances the margin for profit is small at present prices, and that the cost of production is considerably greater than it was a year ago. There is still some iron being offered from a distance, but as a rule it is not of a very desirable character. We know of a sale of a round lot of Eastern Iron that took place a short time ago at a low price, the buyer to have a sample car on trial. It was found upon trial to be of a very poor quality and was rejected, the buyer preferring to have something he could depend upon. With the improved demand, a stronger market is not improbable, as the visible supply of desirable Irons is by no means large. We quote as follows:

Neutral Gray Forge, \$20.00 @ \$21.00, 4 mos. All Ore, Mill, 21.50 @ 22.00, 4 " White and Mottled, 18.50 @ 19.50, 4 " No. 1 Foundry, 22.00 @ 22.50, 4 " No. 2 Foundry, 21.00 @ 21.50, 4 " No. 3 Foundry, 19.50 @ 20.00, 4 " Charcoal Foundry, 22.00 @ 23.00, 4 " Cold Blast Charcoal, 27.00 @ 30.00, 4 " Bessemer Iron, 23.00 @ 23.50, 4 "

We can report sales of Bessemer Iron at \$22 @ \$22.50, cash. No. 1 Bessemer is firm at \$23.10, with sales of 500 tons reported at the price quoted. For standard brands of Gray Forge \$20, cash, is the ruling price, although some furnacemen refuse to sell for less than \$20.50, cash. There has been

more inquiry for Bessemer Iron of late than for any other brand. It is firm at our quotations.

**Muck Bar.**—There is a diversity of feeling in regard to the market. Some brokers say they can sell a good article at from \$34 to \$34.50, cash, whereas we are advised of sales at \$35 to \$35.50, cash. There is as much difference in the quality of Muck Bar as there is in Pig Iron. Hence the wide range of prices.

**Manufactured Iron.**—There has been little or no change in the position of the market during the past week. There is continued activity. Mills have about all they can do and prices are reported steady upon a basis of 2¢ for Bars, 60 days, 2¢ off for cash. The action of the Western Nail Association, at their meeting here last month, in refusing to advance the card is now fully enforced, although some of the members at the meeting strongly advocated an advance at the time.

**Nails.**—The Nail trade continues dull, which is undoubtedly caused by the late Spring. Improved trade is expected before the close of the present month, as stocks in the hands of jobbers must be very much reduced. The combination price remains unchanged at \$2.60, 60 days, 2¢ off for cash in carlots and upward, but desirable orders have been taken for some time past below the price quoted. The monthly meeting of the Western Nail Association takes place at Wheeling next week.

**Wrought Iron Pipe.**—The demand continues to improve, and the mills will soon have about all they can do. They have been in full blast for some time past, but it was in working up stock and getting ready for the busy season, which opens up in April and May. Prices remain unchanged.

**Bessemer Steel Billets.**—We can report sales of American Billets at \$36 @ \$36.50, Nail Slabs at \$34.75 @ \$35, Wire Rods at \$45.50. Nothing doing in Crop Ends, and in the absence of sales for some time past it is difficult to give reliable quotations.

**Old Rails.**—There having been very few sales made here of late, consumers will naturally hold off as long as there is a possibility of prices getting lower. Foreign Tees are quoted for immediate delivery at \$26 @ \$26.50, and for future delivery, canal and rail, at \$1 less.

**Steel Rails.**—There has been no new business reported, in the absence of which we continue to quote Heavy Sections at \$41 @ \$41.50, cash, at mill.

**Railway Track Supplies.**—There has been no change in prices. Spikes, 2.75¢, 30 days, delivered; Splice Bars, 2.20¢ @ 2.30¢; Track Bolts, 3.30¢ with square and 3.4¢ with hexagon nuts.

**Old Material.**—There is a fair business, but prices are not as strong as they were some time ago. No. 1 Railway Wrought Scrap, \$26 @ \$27, net; Long Wrought Turnings, \$19 @ \$20; Old Car Axles, \$32 @ \$33; Cast Scrap, \$19 @ \$20, gross; Cast Borings, \$14 @ \$15; Old Wheels, nominally, \$22 @ \$22.50. There is little or no demand for Wheels in this market, and they are worth more West than can be obtained here.

**Coke.**—Blast furnace Coke remains unchanged at \$2 ½ ton, free on cars at ovens.

## Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., Chattanooga, Tenn., April 4, 1887.

Notwithstanding the backwardness of the season, merchants have no reason whatever to complain, as the amount of business offered is fully up to what they can attend to; especially does this apply to the Hardware and Agricultural trade. A feature of much interest to the Southern manufacturer is the appearance at all the Southern Hardware stores of articles manufactured in the South, which are now forming an important place in their stock of goods.

**Pig Iron.**—The market remains in about the same condition. The furnacemen are not making any new contracts of importance, but this does not concern them much, as most of them have been sold ahead for some time. There are, however, sufficient inquiries coming in that would indicate a sharp revival as soon as the question of freights is settled by the Interstate Commissioners. So far the opinion of many of the general freight agents appears to lean to the view of the case that there will be but little change in the freight rates. Be that as it may, the question does not appear to deter nor discourage the formation of companies for the construction of new furnace plants. There has been no falling off in prices of Pig since our last report; at the same time the situation is not an entirely satisfactory one as regards the future.

**Miscellaneous.**—The Roan Iron and Steel Company expect to be in full blast in the course of a few days, as their machinery is all in place and everything in readiness for the making of Steel Rails. Their books are filled with orders enough to run them for three or four months, of which a large part are for 30's and 35's. A new enterprise has been started at this place with a capital of \$250,000, organized for the purpose of giving aid and assistance to new manufacturing enterprises that may locate within the district.

## Cincinnati.

CINCINNATI, April 1, 1887.

**Pig Iron.**—The conditions having a direct bearing upon the local market have changed but little during the week, and as a natural sequence there has been little, if any, increase in the volume of business; still some firms have experienced a better inquiry for round lots, which of course have as yet resulted in few sales, but a larger number of small orders have been filled for various grades and kinds, most, if not all, of the iron sold receiving the advantage of the old tariff, but to-day trade is introduced to the new commerce law, and various and conflicting are the ideas entertained by the business community respecting the consequences of its enforcement; the tendency, however, is to regard it with less disfavor, and to be more conservative and charitable in measuring, weighing and otherwise estimating its provisions, but, of course, it is yet too early for any one to judge correctly or as reasonably as may be done a week or more hence, when the law may be viewed in the light of experience. The furnaces, especially those of the South, are apparently unchanged of their previous convictions, having confidence in their strong statistical position, and are content to wait while their banks are bare, and they are carrying heavy contracts which disposed of a large portion of their output for a month or two to come. They are also fortified by the large consumption apparent on all hands. Buyers, however, refuse to modify their views to such extremes as are necessary to be in harmony with producers, and the result is a neutral or negative policy—that is, both are content to allow matters to remain their present status or allow circumstances to determine future action, a most philosophical and desirable turn of affairs. A number of consumers continue to complain, and demand the fulfillment of contracts for Pig, and which furnaces seem in no hurry to complete; but these are doubtless exceptions, as it is well known that several furnaces have unexpectedly been unable to turn out the amount of special grades expected. The prices current are without essential change, being quoted as follows for cash, f.o.b. cars at Cincinnati:

**Charcoal Foundry.**  
Hanging Rock, No. 1, \$21.50 @ \$22.00  
Hanging Rock, No. 2, 21.50 @ 21.50  
Southern No. 1, 21.00 @ 21.00  
Southern No. 2, 20.00 @ 20.00

**Coal and Coke Foundry.**  
Ohio Soft Stonecoal, No. 1, 21.00 @ 22.00  
Ohio Soft Stonecoal, No. 2, 20.00 @ 21.00  
Southern Coke, No. 1, 22.00 @ 23.00  
Southern Coke, No. 2, 21.00 @ 22.00  
Southern Coke, No. 3, 20.00 @ 21.00  
Ohio and West Pennsylvania Coke, No. 1, 22.00 @ 23.00  
Ohio and West Pennsylvania Coke, No. 2, 20.50 @ 21.50

**Forge.**  
Strong Neutral Coke, 20.00 @ 20.75  
Mottled, 19.00 @ 19.50  
Southern Coke, 19.50 @ 20.50

**Car Wheel and Malleable Iron.**  
Southern Car Wheel, 27.00 @ 28.00  
Hanging Rock, Cold Blast, 27.00 @ 28.00  
Hanging Rock, Warm Blast, 24.50 @ 25.50  
Lake Superior Malleable, 26.00 @ 27.00

**Manufactured Iron.**—Activity and confidence are the leading features of the market, the prospect of labor troubles as yet cutting a subordinate figure. Rolling mills continue to sell their full product at full prices and foundries are well engaged. Car works are pressed with orders, machine shops are accumulating business rapidly, and agricultural and architectural works are highly encouraged by recent experience. Nail works alone are dull. We quote: Bar Iron, 2¢ @ 2.10¢; Charcoal Bar Iron, 3¢ @ 3.10¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.4¢ @ 3.4¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.4¢ @ 4.4¢ per lb.

**Scrap Iron.**—There is little trading and prices are nominally unchanged at \$26.50 @ \$27 ½ ton for Old Rails, and \$20.50 @ \$21 for Wheels. Wrought and Cast Scrap are little better than nominal.

**Nails.**—There has continued to be a moderate jobbing trade and a steady market, at \$2.70 @ \$2.75 ½ keg for Steel, and \$2.50 @ \$2.60 for Iron, 10d. to 60d., and other sizes at proportionate rates.

## Cleveland.

CLEVELAND, April 1, 1887.

**Iron Ore.**—Buyers stoutly maintain that the market is in their favor. Purchases for the past week have been in lots not exceeding 500 tons, and at the same schedule of prices given for several weeks. If there should be a decline it will not result from the operations of the Interstate Commerce law. If the new freight rates have any effect on the Iron Ore market they will only strengthen prices. There has been a larger shipment to the furnaces during the past six days than for several weeks, owing partially to the end of the strike on the N. Y., P. and O. road, and partially to the desire of shippers to clear the docks as completely as possible before the opening of navigation. All efforts to advance lake rates for transporting Ore beyond the figures at which a majority of the vessels have already been chartered have proven unavailing. The rates are now from 60 to 70 per cent. higher than at the beginning of the season last year, and both mine owners and furnacemen believe these figures quite high enough. The vessels not yet engaged for the season do not represent sufficient tonnage to influence an advance in lake freights. Such an

increase would certainly block the market for some time to come. The present apathy in the Ore trade is due to the fact that buyers and sellers do not just agree regarding prices, and that fully two-thirds of the total output of the mines for 1887 is already sold. The furnacemen do not need to be impatient. They have contracted for sufficient Ore to last them through the summer, and the few thousand tons needed by the different companies to tide them over until the season of 1888 can be bought at any time within the next four months. There is a very active inquiry for strictly pure Bessemer Ore for Steel purposes, and Red Hematites have had quite a sale. The total output of the Gogebie range is now placed at 1,500,000 tons. It is said that 700,000 tons will be taken from a single mine. Selling prices for Ore are firm at these figures:

No. 1 Specular and Magnetic Ores, Bessemer quality, \$6.50 @ 7.40  
No. 1 Specular and Magnetic Ores, Non-Bessemer quality, 6.00 @ 6.75  
Red Hematite Ores, Bessemer quality, 5.50 @ 6.00  
Red Hematite Ores, Non-Bessemer quality, 5.00 @ 5.50  
Manganese Range Ores, Bessemer quality, 5.50 @ 6.25  
Manganese Range Ores, Non-Bessemer quality, 1.75 @ 3.25  
Gogebie Range Ores, Bessemer quality, 5.50 @ 6.00  
Ores for Mill Use, 6.00 @ 7.10

**Pig Iron.**—The sales for April will exceed those of March by at least 20%. There is an active inquiry for all kinds of Pig Iron, and Bessemer are selling very freely. Foundry and Mill Irons are also in good demand. In consequence of an advanced rate to a few points there is a slight change in quotations, strong Foundry Iron, Bessemer quality, advancing from \$22.20 @ \$22.70 to \$22.50 @ \$22.85. Quotations for Mahoning and Shenango Valley Red Short have declined from \$21.20 to \$21. When the carrying rates under the new commerce law have been fully established, it is expected that there will be lively buying. There are no present indications of any important fluctuations in the market. Dealers generally admit that the volume of business done during February and March was light, and that, while trade is picking up, the conflicting views of buyers and sellers must be harmonized regarding carrying rates before there is any substantial improvement. Stocks in consumers' hands seem to be sufficiently large to cause no uneasiness. The following are f.o.b. cash quotations:

Nos. 1, 2, 3 and 4 Lake Superior Charcoal, \$25.00 @ \$26.00  
Nos. 5 and 6 Lake Superior, Bessemer quality, 24.50 @ 25.50  
No. 1 Strong Foundry, Bessemer quality, 22.50 @ 22.85  
No. 1 Strong Foundry, ½ ton, 21.50 @ 22.25  
No. 2 Strong Foundry, ½ ton, 20.70 @ 21.20  
No. 1 American Scotch, ½ ton, 22.20 @ 22.70  
No. 2 American Scotch, ½ ton, 21.70 @ 22.20  
No. 1 Soft Silvery, ½ ton, 21.50 @ 21.70  
Mahoning and Shenango Valley neutral Mill Irons, ½ ton, 21.00 @ 21.50  
Mahoning and Shenango Valley Red Short Mills, ½ ton, 21.00 @ 21.50

**Scrap Iron.**—While there is no improvement in prices, sales are more frequent. Old Rails are quoted at \$26 @ \$27, and Old Car Wheels at \$20. There is an active inquiry apparently for Wheels, and numerous sales are reported.

## Detroit.

CHARLES HEMROD & Co., dealers in Pig Iron, Detroit, Mich., report, under date of April 4, 1887, as follows: Beyond the small orders which have been received and booked recently there is nothing of interest in the Pig-Iron market. Some furnaces feel confident of a strong market for the entire year, and say that buyers must place orders before very long. The important influence which the Interstate Commerce law may have is causing a great deal of delay in all probability. Railroads refuse to name rates ahead, but advise that the high rates recently existing will probably not be made any higher, except in particular localities, and, while this is a trifle indefinite, still it shows that there will be little difference caused by this bill for our local market, which is as follows:

Lake Superior Charcoal, all runs, \$24.50 @ \$25.50  
Lake Superior Coke, All Ore, 24.50 @ 25.50  
Lake Superior Coke, Cinder Mixed, 22.00 @ 23.00  
Standard Ohio Blackbands, 23.50 @ 24.50  
Southern No. 2, 22.50 @ 23.50  
Southern Silvery, 22.00 @ 23.00  
Jackson County, Ohio Silvery, 22.00 @ 23.00  
American Old Iron Rails, 20.00 @ 21.00  
Old Wheels, 20.00 @ 21.00

## Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper, 10¢ @ 11¢  
Light Copper, 8¢ @ 9¢  
Copper Bottoms, 6¢ @ 7¢  
Brass, Heavy, 5¢ @ 6¢  
Brass, Light, 4¢ @ 5¢  
Composition, 3¢ @ 4¢  
Lead, Heavy, 2¢ @ 3¢  
Tea Lead, 1¢ @ 2¢  
Zinc, 1¢ @ 2¢  
Wrought Iron, 2¢ @ 3¢  
Light Iron, 1¢ @ 2¢  
Stove Plate Iron, 1¢ @ 2¢  
Machinery Iron, 1¢ @ 2¢  
Grate Bars, 1¢ @ 2¢  
Old Rubber, 1¢ @ 2¢  
White No. 1, 1¢ @ 2¢  
White No. 2, 1¢ @ 2¢  
Canvas, Cotton, No. 1, 1¢ @ 2¢  
Canvas, Cotton, No. 2, 1¢ @ 2¢  
Canvas, No. 3, 1¢ @ 2¢  
Seconds, 1¢ @ 2¢  
Soft Woollens, 1¢ @ 2¢  
Mixed Rags, 1¢ @ 2¢  
Aunt Baggins, No. 1, 1¢ @ 2¢  
Aunt Baggins, No. 2, 1¢ @ 2¢  
Book Stock, 1¢ @ 2¢  
Newspapers, 1¢ @ 2¢  
Shade Paper, 1¢ @ 2¢  
Kentucky Bagging, 1¢ @ 2¢  
Kentucky Bag Rope, 1¢ @ 2¢  
Kentucky Baling, 1¢ @ 2¢

The New York and Brooklyn Bridge arch, in York street, Brooklyn, has been leased by the Clayton Air Compressor Works, of 11 Dey street, New York, for use as a warehouse for the storage of their stock of air compressors of the larger sizes, as the pressure of orders at their works requires all the available floor space.



## CURRENT HARDWARE PRICES.

APRIL 6, 1887.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at low figures, the manufacturers mean it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

## Ammunition.

Caps, Percussion, 1000—	
Hicks & Goldman's	50¢
F. L. Waterproof, 1-10's	50¢
B. Ground Edge, Central Fire, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢
Double Waterproof, 1-10's	50¢

## Cartridges.

Rim Fire Cartridges	15¢
Rim Fire Military Cartridges	15¢
Cent. Fire Cartridges, Pistol and Rifle	15¢
Cent. Fire Cartridges, Military and Sporting	15¢
Blank Cartridges, except 22 and 32 cal., an additional 10¢ over above discounts.	
Blank Cartridges, 22 cal.	15¢
Blank Cartridges, 32 cal.	15¢
Blank Cartridges, 44 cal.	15¢
Blank Cartridges, 50 cal.	15¢
Blank Cartridges, 56 cal.	15¢
Blank Cartridges, 60 cal.	15¢
Blank Cartridges, 70 cal.	15¢
Blank Cartridges, 80 cal.	15¢
Blank Cartridges, 90 cal.	15¢
Blank Cartridges, 100 cal.	15¢
Blank Cartridges, 110 cal.	15¢
Blank Cartridges, 120 cal.	15¢
Blank Cartridges, 130 cal.	15¢
Blank Cartridges, 140 cal.	15¢
Blank Cartridges, 150 cal.	15¢
Blank Cartridges, 160 cal.	15¢
Blank Cartridges, 170 cal.	15¢
Blank Cartridges, 180 cal.	15¢
Blank Cartridges, 190 cal.	15¢
Blank Cartridges, 200 cal.	15¢

## Primers.

Berdan Primers, all sizes, and B. L. Caps for	
Sturtevant Shell	15¢
All other Primers, all sizes	15¢

## Shells.

Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Rebottle's Combination Shot Shells	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢
Paper Shot Shells, 12 or 20 S. G. qual.	15¢

## Chains.

O. M. C. & W. R. A.—R. E. 11 up	2.00
O. M. C. & W. R. A.—R. E. 11 up	2.00
O. M. C. & W. R. A.—R. E. 11 up	2.00
O. M. C. & W. R. A.—R. E. 11 up	2.00
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O. M. C. & W. R. A.—R. E. 11 up	2.00
O. M. C. & W. R. A.—R. E. 11 up	2.00

## Augers and Bits.

French Falls Co.	25¢
French Falls Co.	25¢
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## Saws.

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## Belting.

Common Standard	75¢
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Standard	75¢
Standard	75¢

## Belting.

Common Standard	75¢
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Standard	75¢

## Belting.

Common Standard	75¢
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# \$100 | AMERICAN GIANT DYNAMO | \$100

Electro-Plating and Electrotyping Machines

IN ALL SIZES, FROM \$100 UPWARDS.



CHEAPEST  
AND BEST IN  
THE MARKET.

Headquarters  
for everything  
in the Plating  
and Polishing  
Line.

NICKEL  
PLATING  
AND  
POLISHING  
MATERIALS.

**ZUCKER & LEVETT CHEMICAL CO.,**  
ESTABLISHED 1863, INCORPORATED 1881,  
SOLE MANUFACTURERS AND PATENTEES,  
WORKS: 538 to 564 W. Sixteenth St. OFFICE: 36 to 40 Eleventh Ave., New York, U. S. A.



# Trade Report.

## General Hardware.

The market continues steady and firm, with a fair movement of goods. Prices have been of late remarkably free from fluctuations, there being but few advances and exceedingly little inclination toward lower quotations. The volume of business is generally referred to as fair for the time of year—the opening of the season being looked forward to as likely to bring a satisfactory trade.

### BARB WIRE.

The New York market is not so strong as it has been, and shading in carload lots is becoming more general. We continue to quote 4 3/4 cents, nominally, for carload lots of Four-Point Galvanized Barb Wire. Some Eastern manufacturers are still busy delivering on old contracts, and are not seeking new business for the present.

### NAILS.

At the close the New York Nail market is quiet and only fairly steady, there being some pressure to sell on the part of a few mills. Rail rates have been fixed in the case of a number of mills in Eastern Pennsylvania, generally showing a heavy advance. In one case, for instance, the rate has been raised from 10 1/2 cents to 15 cents, causing considerable dissatisfaction, and leading to the decision on the part of a few mills to try the experiment of shipping by long neglected water routes. We quote \$2.40 to \$2.50 for carload lots, on dock, of Iron Nails.

A special meeting of the Western Nail Association was held at the Monongahela House, Pittsburgh, on the 5th inst. The business bringing the association together was the annual election of officers and the submission of the annual reports. J. N. Vance, of Wheeling, W. Va., was elected president; C. L. Fitzhugh, of Pittsburgh, was elected first vice-president; W. H. Wallace, of Steubenville, Ohio, was elected second vice-president, and George Wise, of Wheeling, W. Va., was elected secretary. The meeting was largely of a social as well as a business nature. The association adjourned to meet in Cincinnati on the 20th inst.

### MISCELLANEOUS PRICES.

Most lines of Heavy Hardware are unchanged in price, the tendency to advance having been apparently checked, but the goods are held firmly at the advanced figures. There is, indeed, in certain lines a disposition on the part of some of the manufacturers to make still further advances, but thus far it has not been thought desirable to do so. The trade recognizes the impolicy of advancing goods beyond figures which are justified by the present cost of material and manufacture.

The condition of the Hammer market does not improve, and slightly lower prices are ruling. The competition between the manufacturers is animated and the cutting that is being done gives a certain weakness to prices. From this competition in its most active form some of the manufacturers hold aloof, but as a rule the prices for this line of goods are not in a satisfactory condition.

At a meeting of the Lock manufacturers, held to day, a small advance was made, the discount being put at 50 and 10 per cent., instead of 55 and 5 per cent., as heretofore, with the usual cash discount of 2 per cent.

There has been a large business done in Lawn Mowers, and most of the manufacturers are well supplied with orders, covering in some cases nearly their season's production. The prices on the leading machines have been lower than in former seasons, but have been maintained with a good degree of regularity. There has been, however, of late a good deal of enterprise manifested in putting new machines on the market, and the fact that the established manufacturers have not felt this competition more is owing in part to the constantly increasing demand for the machines.

The prices of Planes remain without fluctuation, ruling so low that it is not probable that there will be much further decline, and there being as yet little indication of renewed agreement among the manufacturers. A good deal of business has been done in these goods, and there is some difficulty in obtaining them promptly, the manufacturers being in most cases considerably behind their orders.

The Screw market is very firm so far as the manufacturers are concerned, and there is less disposition than there has been for some time to make concessions in price. There is, however, some irregularity in the current quotations on account of extras, which are given with a good deal of freedom by jobbers who have large stocks on hand. The manufacturers, however, apparently regard this feature of the market with little concern, as it will result in clearing out accumulations in jobbers' hands, and possibly prepare the way for a further advance.

There have been further advances in Sisal Rope, which is thus brought to a point where it is only 1/4 cent on the list less than Manila, a condition of things which is induced by the combined causes of a short crop of the Hemp

and the increased demand for the manufactured article. The Manila market, it is also to be noted, is decidedly firm, there having been recently slight advances in the raw material. If the price should go a little higher, and possibly if the present figures should only be maintained, an advance in Manila Rope may be expected. The following is the present list, which is subject to the usual discount of 1 cent per pound to the trade:

	Per pound.
Manila, 3/4 inch and larger.....	\$0.13
Manila, 1/2 and 5/16 inch.....	.12 1/2
Manila Tarred Rope.....	.12 1/2
Manila Hay Rope.....	.12
Sisal, 3/4 inch and larger.....	.12 1/2
Sisal, 1/2 and 5/16 inch.....	.12 1/2
Sisal Hay Rope.....	.12 1/2
Sisal Tarred Rope.....	.12 1/2
Sisal Single Ply Lath yarn.....	.11 1/2

The File market has not developed much increased strength, and prices are, without doubt, unreasonably low. Some of the manufacturers are holding their goods firmly at prices that yield a fair profit, but the impression prevails that a good many of them are selling at figures that approximate closely to the cost.

There is a good demand for Saws, which are held without material change in price, a tendency being reported by some manufacturers to slightly better figures. Small Circular Saws are referred to as specially active and a shade higher.

Clark, Quien & Morse, Peoria, Ill., have issued their 1887 catalogue, which relates particularly to seasonal specialties, including Steel goods, Shovels and Spades, Lawn Mowers, Freezers, Scythes, Refrigerators and Wagon Hardware, together with a variety of other goods. At the same time they send out a circular relating to the Cambria Link Barb Wire, and a revised price list of Screws, and a revised Nail Card.

The Novelty Lock Company, Chicago, Ill., issue a circular relating to their Improved Novelty Door Locks and Bolt Knobs, with a view to their introduction in places in which they are not now sold. They propose to sell to but one agent in each town, and announce to such special prices which hold good only until the 1st of May.

At a meeting held at Cincinnati, March 23, the National Iron Roofing Association adopted uniform rules for measures and weights which will hereafter govern the members of the association, and which went into effect April 1. Of this association W. A. Dietrick is president and R. J. Hyndman secretary. The resolutions embodying the rules are as follows:

**Resolved,** That Standing Seam and Crimped Edge Roofing, Siding and Ceiling be sold by the square, and that Corrugated Roofing, Siding and Ceiling be sold either by the square or by the pound, as preferred.

**Resolved,** The rules of measurement in selling Standing Seam Iron Roofing shall be as follows: When shipped as sheets, the full length of sheets shall be measured with end locks turned or considered as turned; when shipped in rolls, with the sheets locked together, the running length of the rolls shall be measured together with the actual covering width of the sheets or rolls.

**Resolved,** The rule of measurement for V or Crimped Edge Roofing shall be as follows: The full length of sheets shall be measured, without any allowance for end locks or laps, together with the actual covering width.

**Resolved,** The rule of measurement in selling Corrugated Roofing, Siding or Ceiling, and beaded Iron Siding and Ceiling, shall be the full measurement after being corrugated or beaded, no allowance being made for either side or end laps.

**Resolved,** That for Standing Seam and (V) Crimped Edge Painted Roofing the following shall be the gauges and corresponding weights:

Standard Roofing gauge, weight not less than 75 pounds to the square.	
Standard No. 26 gauge, weight not less than 83 pounds to the square.	
Standard No. 24 gauge, weight not less than 103 pounds to the square.	

**Resolved,** That for Corrugated Painted Iron Roofing, Siding and Ceiling the following shall be the gauges and corresponding weights:

Standard Roofing gauge, weight not less than 75 pounds to the square.	
Standard No. 26 gauge, weight not less than 83 pounds to the square.	
Standard No. 24 gauge, weight not less than 103 pounds to the square.	
Standard No. 22 gauge, weight not less than 127 pounds to the square.	
Standard No. 20 gauge, weight not less than 156 pounds to the square.	

**Resolved,** That Corrugated Iron of less than 2 inches corrugation, and all Irons corrugated crosswise of sheets, be sold at not less than 5 per cent. advance over price of regular Corrugated.

**Resolved,** That in no case shall Nails, Paints, Paper Felting, Wood Strips or Tools be furnished free with Roofing, but shall be charged for as additional items in the bill of Roofing.

**Resolved,** That the following be the price list of the members of the association on painted Iron Roofings:

Standard Roofing gauge, "Roll Cap" Roofing, Standing Seam Roofing, per square.....	\$4.00
Standard Roofing gauge, Crimped Edge Roofing, Beaded Siding and Ceiling, per square.....	3.75
Standard Roofing gauge, Roll Ridge Capping, per lineal foot.....	.12
Standard Roofing gauge, V Ridge Capping, per lineal foot.....	.10
Standard Roof. gauge, Corrugated, per sq. ....	3.75
No. 26 gauge, Corrugated, per square.....	4.00
No. 24 gauge, Corrugated, per square.....	5.75
No. 22 gauge, Corrugated, per square.....	6.75
No. 20 gauge, Corrugated, per square.....	6.75
All orders less than 8 squares, package and drayage extra.	

### ITEMS.

The Moore Mfg. Company, Chicago, Ill., have issued their 1887 catalogue. It relates to the Climax and Zenith Barn Door

Hangers, Moore's Freight Car Door Hangers, Moore's Differential Pulley Blocks and Hand Hoists, Detachable Drive Chain, Novelty Tackle Blocks, &c. It is a descriptive and fully illustrated catalogue of the line to which it refers, and represents the recent additions which the company have made to their assortment.

E. & J. C. Covert, Farmer Village, N. Y., have issued their 11th annual catalogue and price list, which represents their Neck Yoke Centers, Trimmed Neck Yokes and specialties in Saddlery, Coach and General Hardware. In their introductory circular they mention that they have lately added to their extensive factory a number of new machines, enlarging their facilities for carrying on their business. It is a conveniently arranged pamphlet, and illustrates their line with its most recent additions. The pamphlet also contains an interesting article from the Seneca County News Letters, March 19, 1887, relating to the history and extent of their business, some particulars relating to the manufacture being given.

The Shepard Hardware Company, Buffalo, N. Y., refer in a circular issued by them to a suit brought by them in the United States Circuit Court, Eastern District of Wisconsin, against Henry W. Lyman & Co. for infringing letters patent under which the Battles' Cylinder Rings or Wall Safe Heads are made, as having been recently decided in their favor by Judge Dyer, the said court not only sustaining the validity of the patent, but ordering an accounting for damages. A perpetual injunction was also granted against the defendants, enjoining them from making, using or selling the improvements in Stove Pipe Thimbles, covered by these patents.

Announcement is made, under date of March 31, that C. H. Bolles and G. F. Wilde, surviving partners of the wholesale Hardware house of B. Callender & Co., 246 Devonshire street, Boston, Mass., have settled up their old matters, and are now prepared to resume business under favorable auspices. George E. Kimball has become lately associated with them, and will conduct the financial part of the business. Mr. Bolles and Mr. Wilde remaining in the merchandise department, as heretofore. The title of the new house is Bolles, Kimball & Wilde. It is stated that the old partners contribute new capital, Mr. Kimball contributing a still larger amount, so that ample means for conducting the business are thus provided. To their already well-assorted stock of the better class of Shelf Hardware they will add further lines, and the firm are also acting as agents for some leading manufacturers. They will have the best wishes of the trade for their success.

McGregor & Updegraff, McGregor, Iowa, issue a pamphlet devoted to some of their leading lines. The goods covered by it are Iron, Steel and Nails, Blacksmiths' and Wagonmakers' Tools, Wagon and Carriage Hardware and Wood Work, Horse Shoes, Horse Nails, Sleigh Stock, Builders' Supplies, &c. It is a convenient catalogue, which will be appreciated by their customers. It represents some leading goods, and, with its list prices, will be of service.

Miss Catharine Lorillard Wolfe, only surviving child of the late John David Wolfe, hardware merchant, died in this city 4th inst. She was sole heiress of the fortune of \$7,000,000, accumulated during a series of years in the flourishing hardware business of Wolfe & Bishop, in Chambers street. That inheritance, aside from securities, consisted principally of real estate in New York.

We are gratified to be able to announce that A. E. Deitz, for whom J. C. McCarty & Co. are agents, 97 Chambers street, New York, is now in position to supply goods promptly, the damage caused by the recent fire having been repaired, with some increase in his facilities for production.

Valentine Clad, 123 and 125 South Eleventh street, Philadelphia, issues his illustrated spring catalogue and price list of Ice Cream Freezers, Ice Crushers, Packing Cans, Tubs, Molds, &c. An interesting variety of these goods, together with many related specialties, are presented, the catalogue being copiously illustrated.

Peter A. Vogt, Buffalo, N. Y., in his January catalogue, illustrates the line of Refrigerators which he is putting on the market, calling particular attention to some new styles. The special feature of his Refrigerators, which is covered by patents, is the manner in which, by means of rubber strips, the doors are made nearly air-tight, thus securing a saving of ice. It is mentioned that in consequence of the large increase in his trade, he has erected a new six-story building, which will enable him to carry a larger stock than heretofore, and to fill orders more promptly.

The trade will observe the advertisement on page 18 in which J. C. McCarty & Co., 97 Chambers street, New York, call attention to the lines of goods which they are putting on the market. This announcement, it will be observed, gives a list of the manufacturers for whom they are agents, and on whose goods they are prepared to give the most favorable terms. As indicating the important lines on which they are headquarters, it will be of special interest.

Our readers will observe the advertisement on page 45, in which the New York

Stamping Company, Brooklyn, E. D., N. Y., illustrate in an effective manner their Acme Fry Pan, the special features of which they mention.

### WHAT THE TRADE SAY.

The following letter from a Hardwareman in Indiana refers to the condition of trade in that section, with some reflections on the present method of conducting business, as compared with the old, and will be of interest:

In reviewing the past week here is little of interest that presents itself. Life is especially monotonous to the retailer, there being little of incident or accident to change the current of one's thoughts. With not money enough to enter into exciting enjoyments, if such opportunities presented themselves, the absence of capable help to leave in charge of business, and not enough business doing to justify two responsible heads, the retailer's life is passed within the four walls of his store. The ways of business are changed. The farmer and mechanic, instead of being the ones who should be affable and pleasant to secure the good will of the merchant, are now the ones who hold the destiny of the merchant in their hands; who make the merchant's prices, and if he does not see fit to come to their terms, "will send off" and buy from wholesale houses themselves. The old saying "that the merchant behind the counter knows more about his goods than the purchaser" has run out. The widespread circular and price list sent to every tax-payer has brought about this state of affairs. With smaller profits come larger stocks and more expenses, as civilization assumes a higher plane. Telephones, electric light, advertising, higher living, expensive society, all claim their share of the hard-earned dollar. These luxuries follow if a merchant will gain friends and position in a community. Commissions paid to self-constituted agents for influencing sales of your goods, to keep their good will; considerations given to commissioners and barbers to influence purchase of your goods, even at ruinous close figures; paying for puffs in the local papers, are all things that have crept into the mode of doing business. People buy and use an article under a guarantee which you have to give in competition with your neighbor, and seeing something better suited to their fancy, return yours as not filling the bill. A spirit of meekness, which would have been the envy of Moses, must be shown under all these circumstances to "hold your trade." In turn, the same courtesies are expected of the jobbers. Will the good times ever return when the proprietor can meet his well-known customer at the door of his store, and, after a kindly greeting and hand-shaking, inquiring after the welfare of his family, call John and ask him to wait upon Mr. —; then return to his post ready to receive the next customer, feeling assured that Mr. — will buy, and John will not have to offer slaughtering inducements to effect the sale. In the competition for business it is well to stop in our haste and ask if we are not demeaning ourselves by some of our shrewd practices, and if our consciences are as clear from trifling dishonesties in our business as they used to be. Where will it end?

There are no important changes in price. Trade is quiet in this section. The development of natural gas will largely affect the class of heaters sold next winter, and stove men are building heaters more adapted to the use of natural gas than those already in use. A small open fireplace heater on casters, attached to a flexible rubber tubing from the gas main, so that the heater can be rolled to different parts of the room or house, has many advantages. Grates for coal or gas burning, to be put into heaters or cooks already in use, are on the market, but we understand there is little sale for the present style of hard-coal heaters where they have natural gas.

### EXPORT TRADE.

From a correspondent in Barbadoes we have the following letter relating to the position of American goods in that market. Going, as it does, into the matter with some detail, it will be of special interest to our readers. In regard to the extent to which American goods are displacing English, our correspondent says:

The following goods sold here are chiefly American: Sewing machines (hand, chiefly), New National, Remington, American. Tailors' and Shoemakers' machines are mostly English, but we dare assert that for every 500 hand machines sold here there are only one, or, at the furthest, two treadle machines. Counter Scales, Fairbank's and Howe's make, chiefly for counter use, although there are a great many platform machines as well, but the very large scales, such as are used to weigh carts and wagons laden with coal and such goods, are English. This we think is from the fact that they are all over iron, even the platform, and the belief prevails here that English goods being heavier will stand more rough usage. What we consider a little drawback to American Counter Scales is that they are almost always priced with iron weights which very soon rust, and become inaccurate when used to weigh salt and pickled meat and fish. We think it would not be a bad plan for makers to price their Scales—1, with iron weights as now; 2, with a cheap white metal weight that will not rust; 3, Scale only, without weights. We can safely say that no grocer or respectable shopkeeper our way would dream of using any other Scales except American made, and in our business we have no other kinds in use. American Locks, we consider, are fast superseding the English ones, especially Cabinet Locks and Rim Knob Locks for front doors. We have not yet, however, been able to get an American Plate (Wood Stock) Lock to compete with the English at same prices. They are also too lightly made, and this holds good to with respect to Dead Locks. Of course you must understand that there is very little demand here for expensive Locks; it is only the cheaper kind that go. Kerosene Lamps and their fittings are also freely sold of American make,

but the English have the trade for the best quality Table and Hanging Lamps. Lamp Stoves with us have almost shut out the English ones, and we consider we do as good a trade in them as any other Hardware house in the island. Cheap American Furniture Varnish is the only thing of its kind that can be sold, but coach painters will use no other for their work except that of Marder Bros., Wolverhampton. We tried some time ago to sell Hand Saws from Disston, but the blades were very thin, and the Saws have been in stock ever since. American Shovels and Forks are also sold here, and all the tar, pitch, rosin and turpentine which we get rid of comes from the States. We believe that the importation of American Hardware will increase, but at present the island is suffering from the low price of sugar, and it is risky importing any new idea, as our people are not able in a money sense to try them. The Corcoran Wind Mill for raising water has got a very good hold here now, and the Stover has lately entered into competition, but as yet without any very good success.

### LADD'S DISCOUNT BOOK.

In answer to the numerous inquiries about this valuable work, to which we called attention in a recent issue, we give herewith one page of the book covering discounts 60, 10, 10 and 7 1/2 and their parts, also the equivalent discounts. This page is a specimen of the whole, the pages being uniform in arrangement and giving the net of any amount from 1 cent to larger sums at discounts ranging from 1 per cent. to 95 per cent., together with their combinations both simple and complex.

To show the manner of use for finding accurate net amounts with rapidity, take an example from the page shown above: What is the net of \$83 at 60, 10, 10, 7 1/2 and 2 1/2 per cent? Find the discount, and then the figure 83 in heavy type; the small figures to the right will indicate the net amount to be \$24.25. Enlarging the first amount simply involves the change of a decimal point; for instance, 83 cents nets 24 cents, \$8.30 nets \$2.42, \$83 nets \$24.25, \$830 nets \$242.53, \$8300 nets \$2425.32.

To find the net of dollars and cents, say \$83.28: First find the net of \$83, as above, then refer to the figure 28 in the heavy type, and the small figures will show the net of 28 cents—namely, .0818 cents (or, in round figure, 8 cents). By placing fingers under 83 and 28, respectively, the result (\$24.33) will be seen at a glance. For making prices or finding list prices the operation is reversed. For instance, you want to use the same discount, 60, 10, 10, 7 1/2 and 2 1/2, and net \$5.25. What is the list price? Find \$5.25 in the smaller type and the heavy type at the left, 18 for \$18, shows the list required. The discounts and their equivalents ("Same as"), give net results that are precisely alike. This makes the book singularly complete, and enhances its value by enabling one to change an unwieldy discount into a more practicable one instantly, without affecting the result, or to use part of a discount, reserving the remainder for profit.

The above examples illustrate the ordinary manner of using. Explanations of various methods are clearly given in the book, and doubtless others will be discovered by those who become familiar with it. The hearty welcome with which this book is received by the trade may be seen by the words of appreciation given in the advertisement on page 20.

### TRADE-MARKS.

A recent issue of the Boston Herald contains the following reference to legislation relating to trade marks:

A law to punish those who fraudulently use trade-marks has been introduced in the English Parliament, and should it prove in practice as comprehensive and effectual as it promises to be in theory, it might be well for our Congress to enact similar regulations. English manufacturers complain, as our American manufacturers do, that if they acquire a good trade in consequence of the superior style, finish, or other excellences of the articles made by them, it is often found that the goods of an inferior character are placed upon the market labeled or ticketed with their trade-mark. Sometimes these are of home, and other times of foreign make, and it not infrequently happens that a foreigner wishing to make a sale of his ware will send them in for sale under the trade-mark of a well-known home manufacturer. The proposed law makes the possession of goods bearing fraudulent trade-marks *prima facie* evidence of intended fraud, and the burden of proof is thrown upon the possessors to demonstrate that the deception was not theirs, or that they were not accomplices in it. Those who aid in any way in the disposal of articles thus fraudulently marked, either by transporting, advertising or displaying them, are held liable, unless they can show that they had no knowledge of their fraudulent character. And, what is more, this law can be availed of by both Englishmen and by foreigners whose business has been in any way interfered with by unjustifiable English competition. Thus, as an instance of one good effect the law will probably have, it is said that American trade in cotton cloths in China has been seriously interfered with by English manufacturers sending to that country cheaply woven and heavily-sized fabrics which have borne the trade-mark of well-known American mills. As these English cloths have been sold at a lower price than the American fabrics, they have not only taken away the trade from the American manufacturer, but, on account of the fraudulent trade-mark, they have injured his reputation in the eyes of his Chinese customers. Now, if the proposed law goes into effect, the American manufacturer who is thus injured can not only



60, 10, 10 & 7½. Same as 55, 20, 10, 10 & 7½. 40, 33½, 10, 10, 10 & 7½. 33½, 20, 10, 10, 10 & 7½. 33½, 20, 10, 10, 10 & 7½.									
1 00.29.97	11 03.29.67	21 06.29.37	31 09.29.07	41 12.28.77	51 15.28.47	61 18.28.17	71 21.27.87	81 24.27.57	91 27.27.27
2 00.59.94	12 03.59.64	22 06.59.34	32 09.59.04	42 12.58.74	52 15.58.44	62 18.58.14	72 21.57.84	82 24.57.54	92 27.57.24
3 00.89.91	13 03.89.61	23 06.89.31	33 09.89.01	43 12.88.71	53 15.88.41	63 18.88.11	73 21.87.81	83 24.87.51	93 27.87.21
4 01.19.88	14 03.19.58	24 06.19.28	34 09.19.98	44 12.78.68	54 15.78.38	64 18.78.08	74 21.77.78	84 24.77.48	94 27.77.18
5 01.49.85	15 03.49.55	25 06.49.25	35 09.49.95	45 12.68.65	55 15.68.35	65 18.68.05	75 21.67.75	85 24.67.45	95 27.67.15
6 01.79.82	16 03.79.52	26 06.79.22	36 09.79.92	46 12.58.62	56 15.58.32	66 18.58.02	76 21.57.72	86 24.57.42	96 27.57.12
7 02.09.79	17 03.09.49	27 06.09.19	37 09.09.97	47 12.48.59	57 15.48.29	67 18.48.09	77 21.47.79	87 24.47.49	97 27.47.19
8 02.39.76	18 03.39.46	28 06.39.16	38 09.39.94	48 12.38.56	58 15.38.26	68 18.38.06	78 21.37.76	88 24.37.46	98 27.37.16
9 02.69.73	19 03.69.43	29 06.69.13	39 09.69.91	49 12.28.53	59 15.28.23	69 18.28.03	79 21.27.73	89 24.27.43	99 27.27.13
10 02.99.70	20 03.99.40	30 06.99.10	40 09.99.88	50 12.18.50	60 15.18.20	70 18.18.00	80 21.17.70	90 24.17.40	100 27.17.10

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2 00.59.94	12 03.59.64	22 06.59.34	32 09.59.04	42 12.58.74	52 15.58.44	62 18.58.14	72 21.57.84	82 24.57.54	92 27.57.24
3 00.89.91	13 03.89.61	23 06.89.31	33 09.89.01	43 12.88.71	53 15.88.41	63 18.88.11	73 21.87.81	83 24.87.51	93 27.87.21
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5 01.49.85	15 03.49.55	25 06.49.25	35 09.49.95	45 12.68.65	55 15.68.35	65 18.68.05	75 21.67.75	85 24.67.45	95 27.67.15
6 01.79.82	16 03.79.52	26 06.79.22	36 09.79.92	46 12.58.62	56 15.58.32	66 18.58.02	76 21.57.72	86 24.57.42	96 27.57.12
7 02.09.79	17 03.09.49	27 06.09.19	37 09.09.97	47 12.48.59	57 15.48.29	67 18.48.09	77 21.47.79	87 24.47.49	97 27.47.19
8 02.39.76	18 03.39.46	28 06.39.16	38 09.39.94	48 12.38.56	58 15.38.26	68 18.38.06	78 21.37.76	88 24.37.46	98 27.37.16
9 02.69.73	19 03.69.43	29 06.69.13	39 09.69.91	49 12.28.53	59 15.28.23	69 18.28.03	79 21.27.73	89 24.27.43	99 27.27.13
10 02.99.70	20 03.99.40	30 06.99.10	40 09.99.88	50 12.18.50	60 15.18.20	70 18.18.00	80 21.17.70	90 24.17.40	100 27.17.10

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2 00.59.94	12 03.59.64	22 06.59.34	32 09.59.04	42 12.58.74	52 15.58.44	62 18.58.14	72 21.57.84	82 24.57.54	92 27.57.24
3 00.89.91	13 03.89.61	23 06.89.31	33 09.89.01	43 12.88.71	53 15.88.41	63 18.88.11	73 21.87.81	83 24.87.51	93 27.87.21
4 01.19.88	14 03.19.58	24 06.19.28	34 09.19.98	44 12.78.68	54 15.78.38	64 18.78.08	74 21.77.78	84 24.77.48	94 27.77.18
5 01.49.85	15 03.49.55	25 06.49.25	35 09.49.95	45 12.68.65	55 15.68.35	65 18.68.05	75 21.67.75	85 24.67.45	95 27.67.15
6 01.79.82	16 03.79.52	26 06.79.22	36 09.79.92	46 12.58.62	56 15.58.32	66 18.58.02	76 21.57.72	86 24.57.42	96 27.57.12
7 02.09.79	17 03.09.49	27 06.09.19	37 09.09.97	47 12.48.59	57 15.48.29	67 18.48.09	77 21.47.79	87 24.47.49	97 27.47.19
8 02.39.76	18 03.39.46	28 06.39.16	38 09.39.94	48 12.38.56	58 15.38.26	68 18.38.06	78 21.37.76	88 24.37.46	98 27.37.16
9 02.69.73	19 03.69.43	29 06.69.13	39 09.69.91	49 12.28.53	59 15.28.23	69 18.28.03	79 21.27.73	89 24.27.43	99 27.27.13
10 02.99.70	20 03.99.40	30 06.99.10	40 09.99.88	50 12.18.50	60 15.18.20	70 18.18.00	80 21.17.70	90 24.17.40	100 27.17.10

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3 00.89.91	13 03.89.61	23 06.89.31	33 09.89.01	43 12.88.71	53 15.88.41	63 18.88.11	73 21.87.81	83 24.87.51	93 27.87.21
4 01.19.88	14 03.19.58	24 06.19.28	34 09.19.98	44 12.78.68	54 15.78.38	64 18.78.08	74 21.77.78	84 24.77.48	94 27.77.18
5 01.49.85	15 03.49.55	25 06.49.25	35 09.49.95	45 12.68.65	55 15.68.35	65 18.68.05	75 21.67.75	85 24.67.45	95 27.67.15
6 01.79.82	16 03.79.52	26 06.79.22	36 09.79.92	46 12.58.62	56 15.58.32	66 18.58.02	76 21.57.72	86 24.57.42	96 27.57.12
7 02.09.79	17 03.09.49	27 06.09.19	37 09.09.97	47 12.48.59	57 15.48.29	67 18.48.09	77 21.47.79	87 24.47.49	97 27.47.19
8 02.39.76	18 03.39.46	28 06.39.16	38 09.39.94	48 12.38.56	58 15.38.26	68 18.38.06	78 21.37.76	88 24.37.46	98 27.37.16
9 02.69.73	19 03.69.43	29 06.69.13	39 09.69.91	49 12.28.53	59 15.28.23	69 18.28.03	79 21.27.73	89 24.27.43	99 27.27.13
10 02.99.70	20 03.99.40	30 06.99.10	40 09.99.88	50 12.18.50	60 15.18.20	70 18.18.00	80 21.17.70	90 24.17.40	100 27.17.10

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2 00.59.94	12 03.59.64	22 06.59.34	32 09.59.04	42 12.58.74	52 15.58.44	62 18.58.14	72 21.57.84	82 24.57.54	92 27.57.24
3 00.89.91	13 03.89.61	23 06.89.31	33 09.89.01	43 12.88.71	53 15.88.41	63 18.88.11	73 21.87.81	83 24.87.51	93 27.87.21
4 01.19.88	14 03.19.58	24 06.19.28	34 09.19.98	44 12.78.68	54 15.78.38	64 18.78.08	74 21.77.78	84 24.77.48	94 27.77.18
5 01.49.85	15 03.49.55	25 06.49.25	35 09.49.95	45 12.68.65	55 15.68.35	65 18.68.05	75 21.67.75	85 24.67.45	95 27.67.15
6 01.79.82	16 03.79.52	26 06.79.22	36 09.79.92	46 12.58.62	56 15.58.32	66 18.58.02	76 21.57.72	86 24.57.42	96 27.57.12
7 02.09.79	17 03.09.49	27 06.09.19	37 09.09.97	47 12.48.59	57 15.48.29	67 18.48.09	77 21.47.79	87 24.47.49	97 27.47.19
8 02.39.76	18 03.39.46	28 06.39.16	38 09.39.94	48 12.38.56	58 15.38.26	68 18.38.06	78 21.37.76	88 24.37.46	98 27.37.16
9 02.69.73	19 03.69.43	29 06.69.13	39 09.69.91	49 12.28.53	59 15.28.23	69 18.28.03	79 21.27.73	89 24.27.43	99 27.27.13
10 02.99.70	20 03.99.40	30 06.99.10	40 09.99.88	50 12.18.50	60 15.18.20	70 18.18.00	80 21.17.70	90 24.17.40	100 27.17.10

SPECIMEN PAGE OF LADD'S DISCOUNT BOOK.

proceed against the English manufacturer, but also against the English ship-owners whose vessels carried these goods to the Chinese market. The law is one the operation of which will be studied in this country with not a little interest.

## GAS FOR FUEL.

The following statement in regard to the proposed establishment by Henry Diston & Sons, Philadelphia, of a plant for the manufacture of gas for fuel is taken from a recent issue of the *Philadelphia Press*, and giving as it does the facts in the case with substantial correctness, we take pleasure in laying it before our readers:

The firm of Henry Diston & Sons are about to introduce in their steel works at Tacony a fuel gas plant, in the hope of successfully meeting the competition of iron and steel workers who utilize the natural gas plants of Pittsburgh and vicinity. A new process of making gas for fuel purposes has recently been invented, and Diston & Sons, after a careful examination into its merits, regard the success of their experiment as almost assured. If the new process brings about all the results that are claimed for it by conservative pledges, it will revolutionize the iron and steel industry in the East and remove the disadvantage at which Eastern manufacturers are at present placed in competition with those in the Western part of the State. Besides this, the new process can be used equally well in the manufacture of glass as of iron and steel, and, in fact, if it proves as successful as it promises to be, it can be as easily and readily applied as a substitute for coal as natural gas has been. The process which promises such grand results is the invention of Burdett Loomis, of Hartford, Conn. Two weeks ago Diston & Sons commenced the erection of an experimental plant for their steel melting departments, to have a capacity of 1,500,000 feet per day. It is expected that the plant will be put in practical operation within 30 days, and is intended merely as a preliminary trial, the future increase in its capacity to be determined by the degree of success achieved in the experiment. The apparatus with which the Loomis gas is made is said to be very simple, and the cost of production is comparatively low. The inventor, it is stated, has been working on the problem for four or five years, and very sensibly pursued a policy of secrecy in regard to it, preferring to give no publicity to his work until he had satisfied himself that it would be successful. In the middle of September last the attention of the Diston firm was called to the

necessity of obtaining a cheaper process of melting steel than that in operation at their works in Tacony. The employees at the file works had asked a material advance in wages, and the rolling mill hands also expressed dissatisfaction with the rates they were receiving, alleging that higher prices were paid for the same work in other parts of the country. The firm were convinced that they were paying higher wages than the majority of their competitors, but the men could not be made to realize the fact. A strike of a portion of the force, therefore, ensued early in October, though the most

to produce steel much more cheaply than could be done outside of the gas territory. Mr. Horace Lisson and Mr. Samuel Williams, the superintendent of the steel department, looked into the natural-gas system thoroughly, and were so strongly impressed with its economies that the firm proposed to remove their entire steel plant from Tacony to Pittsburgh, in order to avail themselves of the advantages of natural gas.

More recently, however, the subject of artificial gas was taken up, and Mr. Williams was commissioned by the firm to go to



Fig. 1.



Fig. 3.

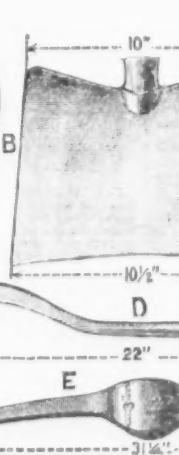


Fig. 4.



Fig. 5.

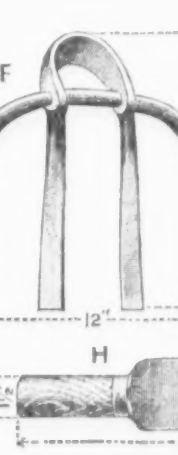


Fig. 6.



Fig. 7.

harmonious relations existed between the firm and the men. In the settlement of the difficulty some days afterward it was stipulated that a committee of the men and a representative of the firm should make a personal inspection of the leading steel rolling mills of the country and ascertain the amount of wages paid in those establishments, the men pledging themselves to accept the same rates as prevailed in other places. As a result it was found that the Distons were paying considerably more for their work than other firms, and the men, according to their stipulation, yielded their point and accepted the situation. The investigations made by the firm into the manufacture of steel elsewhere shows that by the use of natural gas the Pittsburgh manufacturers were enabled

Pittsburgh again and investigate. "After some four months' careful examination," Mr. Williams said yesterday, "in which a great many different processes were looked into, I was impressed with the merits of the new process, and the firm, deeming this the most promising of all the plants that had been investigated and the best adapted to the purposes of fuel gas required, decided finally to try a plant on the plan. The plant that we are putting in will demonstrate the practicability of the process. If it proves successful, we propose to erect a greater plant to supply the entire works, for fire, boilers and everything connected with the establishment. In our melting department the Siemens coal gas is being used, which has, heretofore, been regarded as the cheapest known gas outside of natural gas. This

largely due to the hammering—and the iron is generally superior. They are all made for utility, and no doubt bear well the strain to which they are put. Makers must take care to send out wares which are thoroughly reliable in the material, that the Chinese, if they take to the foreign productions, may find them quite as durable as the rude implements with which they have got along up to this time.

Dr. Henry D. Cogswell, of San Francisco, has deeded \$1,000,000 to a board of trustees, for the purpose of establishing and maintaining in the city of San Francisco a polytechnical college, which shall enable Californian boys and girls over the age of 14 years to acquire a practical training in the various industries by which it is possible to make an honorable and comfortable living.

## Work on the New Navy.

Notwithstanding the fact that a number of new inventions and appliances not contemplated in the scheme of the Navy Advisory Board have been placed on the new cruisers, the department is confident that they can be completed at a cost within the estimates of that board, so far as concerns the work of construction and steam engineering. It is believed that the total cost of fitting the engineering work on the Chicago will be \$150,000 less than the estimates, and in the case of the Boston and Atlanta, \$15,000 and \$15,000 respectively. The figures include the cost of the new appliances above referred to, such as ice machines, separators, and electric light plants. The Atlanta has been ordered to be docked at New York to have her bottom cleaned and painted. She is now being fitted with separator to prevent foaming in the boilers, and will be dispatched on another trial trip in a short time. The Boston, now at New York, is being fitted with ice machines, electric lights, and steam separators, and will be ready for a trial trip within a few weeks.

The Chicago is not so far advanced toward completion as the other cruisers, but the engines have been practically finished, and only a small amount of construction work remains to be done. She will soon be removed from Chester to the New York Navy Yard. Owing to the good results obtained at her recent dock trial the engineering bureau feel that the vessel is already an assured success. Particular gratification is expressed at the good performance of the "new beam" engines, which were regarded as purely experimental and of somewhat doubtful expediency. Contrary to expectation, they ran very smoothly, and gave rise to very little vibration. Little of the trouble experienced with the Atlanta and Boston in securing an air-tight fireroom was encountered in the case of the Chicago, but an excellent forced draft was easily procured, and altogether it is believed that she will be much the best ship of the three new cruisers. The Navy Department is about to begin the preparation of plans for the two 1700-ton gunboats, for which provision was made by the last Congress. Inasmuch as these boats are to



# WHOLESALE METAL PRICES, APRIL 6, 1887.

## METALS.

**IRON.**—Duty: Bars, 8-10¢ to 11-10¢; rolled that no bar iron shall pay a less rate of duty than 35¢. Sheet, 11-0¢ to 15-10¢. Band, Hoop and Scroll, 1¢ to 1-4-10¢. Railroad Bars weighing more than 25 lb per yard, 7-10¢ of 1¢ per lb.

**Standard American Pig Iron.**  
 Foundry No. 1 X..... 21.50  
 Foundry No. 2 X..... 20.50  
 Gray Forge..... 19.00

**No. 1 Scotch Pig Iron.**  
 Carnbro..... 22.50  
 Coltness..... 22.50  
 Rhotts..... 22.50  
 Glasgow..... 22.50  
 Gartshore..... 22.50  
 Langloan..... 22.50  
 Summerlee..... 22.50  
 Dalmenington..... 21.50  
 Eglinton..... 20.50  
 Clyde..... 20.50

**Steel at Eastern Mills.**  
 Steel at Eastern Mills..... 20.00  
 Old Rails..... 20.00

**Wrought, from yard.**  
 Common Iron..... 24.00  
 1 to 2 in. round and square..... 23.00  
 1 to 6 in. x 1/2 to 1 in..... 23.00

**Refined Iron.**  
 1 to 2 in. round and square..... 24.00  
 1 to 6 in. x 1/2 to 1 in..... 24.00  
 1 to 6 in. x 1/2 to 1 in..... 24.00

**Rods—1 to 6 in. round and square.**  
 Rods—1 to 6 in. round and square..... 24.00  
 Rods—1 to 6 in. round and square..... 24.00  
 Rods—1 to 6 in. round and square..... 24.00

**Sheet Iron from Store.**  
 Common..... 24.00  
 American..... 24.00  
 Russian..... 24.00

**Iron Wire.**  
 10 to 16..... 24.00  
 17 to 20..... 24.00  
 21 to 24..... 24.00  
 25 and 26..... 24.00

**Galvanized 16 to 20.**  
 Galvanized 16 to 20..... 24.00  
 Galvanized 21 to 24..... 24.00  
 Galvanized 25 and 26..... 24.00

**Steel.**  
 Steel..... 24.00  
 Steel..... 24.00  
 Steel..... 24.00

**Steel Cast Steel.**  
 Steel Cast Steel..... 24.00  
 Steel Cast Steel..... 24.00  
 Steel Cast Steel..... 24.00

**English Steel.**  
 English Steel..... 24.00  
 English Steel..... 24.00  
 English Steel..... 24.00

**Best Cast.**  
 Best Cast..... 24.00  
 Best Cast..... 24.00  
 Best Cast..... 24.00

**Extra Cast.**  
 Extra Cast..... 24.00  
 Extra Cast..... 24.00  
 Extra Cast..... 24.00

**Swaged Cast.**  
 Swaged Cast..... 24.00  
 Swaged Cast..... 24.00  
 Swaged Cast..... 24.00

**Best Double Sheet.**  
 Best Double Sheet..... 24.00  
 Best Double Sheet..... 24.00  
 Best Double Sheet..... 24.00

**Blister, 1st quality.**  
 Blister, 1st quality..... 24.00  
 Blister, 1st quality..... 24.00  
 Blister, 1st quality..... 24.00

**German Steel, Best.**  
 German Steel, Best..... 24.00  
 German Steel, Best..... 24.00  
 German Steel, Best..... 24.00

**3d quality.**  
 3d quality..... 24.00  
 3d quality..... 24.00  
 3d quality..... 24.00

**Sheet Cast Steel, 1st quality.**  
 Sheet Cast Steel, 1st quality..... 24.00  
 Sheet Cast Steel, 1st quality..... 24.00  
 Sheet Cast Steel, 1st quality..... 24.00

**3d quality.**  
 3d quality..... 24.00  
 3d quality..... 24.00  
 3d quality..... 24.00

**TIN.**  
 Tin..... 24.00  
 Tin..... 24.00  
 Tin..... 24.00

**Plates, Sheets, Tagger and Terne.**  
 Plates, Sheets, Tagger and Terne..... 24.00  
 Plates, Sheets, Tagger and Terne..... 24.00  
 Plates, Sheets, Tagger and Terne..... 24.00

**Best Cast.**  
 Best Cast..... 24.00  
 Best Cast..... 24.00  
 Best Cast..... 24.00

**Extra Cast.**  
 Extra Cast..... 24.00  
 Extra Cast..... 24.00  
 Extra Cast..... 24.00

**Swaged Cast.**  
 Swaged Cast..... 24.00  
 Swaged Cast..... 24.00  
 Swaged Cast..... 24.00

**Best Double Sheet.**  
 Best Double Sheet..... 24.00  
 Best Double Sheet..... 24.00  
 Best Double Sheet..... 24.00

**Blister, 1st quality.**  
 Blister, 1st quality..... 24.00  
 Blister, 1st quality..... 24.00  
 Blister, 1st quality..... 24.00

**German Steel, Best.**  
 German Steel, Best..... 24.00  
 German Steel, Best..... 24.00  
 German Steel, Best..... 24.00

**3d quality.**  
 3d quality..... 24.00  
 3d quality..... 24.00  
 3d quality..... 24.00

**Sheet Cast Steel, 1st quality.**  
 Sheet Cast Steel, 1st quality..... 24.00  
 Sheet Cast Steel, 1st quality..... 24.00  
 Sheet Cast Steel, 1st quality..... 24.00

**3d quality.**  
 3d quality..... 24.00  
 3d quality..... 24.00  
 3d quality..... 24.00

**TIN.**  
 Tin..... 24.00  
 Tin..... 24.00  
 Tin..... 24.00

**Plates, Sheets, Tagger and Terne.**  
 Plates, Sheets, Tagger and Terne..... 24.00  
 Plates, Sheets, Tagger and Terne..... 24.00  
 Plates, Sheets, Tagger and Terne..... 24.00

**Best Cast.**  
 Best Cast..... 24.00  
 Best Cast..... 24.00  
 Best Cast..... 24.00

**LEAD.**—Duty: Pig, 2¢ per 100 lb; Old Lead, 2¢ per 100 lb; Pipe and Sheet, 3¢ per 100 lb.

**ANTIMONY.**  
 Antimony..... 24.00  
 Antimony..... 24.00  
 Antimony..... 24.00

**SPELTER.**—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

**ZINC.**—Duty: Pig or Block, \$1.50 per 100 lbs.

**Zinc Tubing—Dia. 35.**  
 Zinc Tubing—Dia. 35..... 24.00  
 Zinc Tubing—Dia. 35..... 24.00  
 Zinc Tubing—Dia. 35..... 24.00

**Plain.**  
 Plain..... 24.00  
 Plain..... 24.00  
 Plain..... 24.00

**Fancy.**  
 Fancy..... 24.00  
 Fancy..... 24.00  
 Fancy..... 24.00

**Scotch and Extra Patterns.**  
 Scotch and Extra Patterns..... 24.00  
 Scotch and Extra Patterns..... 24.00  
 Scotch and Extra Patterns..... 24.00

**RABBIT METAL.**  
 Rabbit Metal..... 24.00  
 Rabbit Metal..... 24.00  
 Rabbit Metal..... 24.00

**Market Wire.**  
 Market Wire..... 24.00  
 Market Wire..... 24.00  
 Market Wire..... 24.00

**Bright Market Wire.**  
 Bright Market Wire..... 24.00  
 Bright Market Wire..... 24.00  
 Bright Market Wire..... 24.00

**Charcoal.**  
 Charcoal..... 24.00  
 Charcoal..... 24.00  
 Charcoal..... 24.00

**Bale Wire, Nos. 7 to 12.**  
 Bale Wire, Nos. 7 to 12..... 24.00  
 Bale Wire, Nos. 7 to 12..... 24.00  
 Bale Wire, Nos. 7 to 12..... 24.00

**Galvanized Market Wire.**  
 Galvanized Market Wire..... 24.00  
 Galvanized Market Wire..... 24.00  
 Galvanized Market Wire..... 24.00

**Stone or Weaving Wire.**  
 Stone or Weaving Wire..... 24.00  
 Stone or Weaving Wire..... 24.00  
 Stone or Weaving Wire..... 24.00

**Cast Steel, Steel Wire list.**  
 Cast Steel, Steel Wire list..... 24.00  
 Cast Steel, Steel Wire list..... 24.00  
 Cast Steel, Steel Wire list..... 24.00

**Brass and Copper Wire.**  
 Brass and Copper Wire..... 24.00  
 Brass and Copper Wire..... 24.00  
 Brass and Copper Wire..... 24.00

**Old English Gauge the Standard.**  
 Old English Gauge the Standard..... 24.00  
 Old English Gauge the Standard..... 24.00  
 Old English Gauge the Standard..... 24.00

**Common High Low.**  
 Common High Low..... 24.00  
 Common High Low..... 24.00  
 Common High Low..... 24.00

**Brass.**  
 Brass..... 24.00  
 Brass..... 24.00  
 Brass..... 24.00

**Copper.**  
 Copper..... 24.00  
 Copper..... 24.00  
 Copper..... 24.00

**Spring Wire, 2 cents per pound advance.**  
 Spring Wire, 2 cents per pound advance..... 24.00  
 Spring Wire, 2 cents per pound advance..... 24.00  
 Spring Wire, 2 cents per pound advance..... 24.00

**Whitened Wire, 8 cents per pound advance.**  
 Whitened Wire, 8 cents per pound advance..... 24.00  
 Whitened Wire, 8 cents per pound advance..... 24.00  
 Whitened Wire, 8 cents per pound advance..... 24.00

**Half-Round Wire, 4 cents advance on Round Wire.**  
 Half-Round Wire, 4 cents advance on Round Wire..... 24.00  
 Half-Round Wire, 4 cents advance on Round Wire..... 24.00  
 Half-Round Wire, 4 cents advance on Round Wire..... 24.00

**Fancy Wire, not less than 10 cents advance on Round Wire.**  
 Fancy Wire, not less than 10 cents advance on Round Wire..... 24.00  
 Fancy Wire, not less than 10 cents advance on Round Wire..... 24.00  
 Fancy Wire, not less than 10 cents advance on Round Wire..... 24.00

**Spooling on one-pound Spools, 12 cents per pound extra.**  
 Spooling on one-pound Spools, 12 cents per pound extra..... 24.00  
 Spooling on one-pound Spools, 12 cents per pound extra..... 24.00  
 Spooling on one-pound Spools, 12 cents per pound extra..... 24.00

**Spooling on ten-pound Spools or more, 2 cents per pound extra.**  
 Spooling on ten-pound Spools or more, 2 cents per pound extra..... 24.00  
 Spooling on ten-pound Spools or more, 2 cents per pound extra..... 24.00  
 Spooling on ten-pound Spools or more, 2 cents per pound extra..... 24.00

**MISCELLANEOUS TINNERS' STOCK.**  
 Miscellaneous Tanners' Stock..... 24.00  
 Miscellaneous Tanners' Stock..... 24.00  
 Miscellaneous Tanners' Stock..... 24.00

**Solder.**  
 Solder..... 24.00  
 Solder..... 24.00  
 Solder..... 24.00

**1/2 & 1/4 Warranted.**  
 1/2 & 1/4 Warranted..... 24.00  
 1/2 & 1/4 Warranted..... 24.00  
 1/2 & 1/4 Warranted..... 24.00

**Extra.**  
 Extra..... 24.00  
 Extra..... 24.00  
 Extra..... 24.00

**No. 1 Refined.**  
 No. 1 Refined..... 24.00  
 No. 1 Refined..... 24.00  
 No. 1 Refined..... 24.00

**No. 2 Solder.**  
 No. 2 Solder..... 24.00  
 No. 2 Solder..... 24.00  
 No. 2 Solder..... 24.00

**Extra wiping.**  
 Extra wiping..... 24.00  
 Extra wiping..... 24.00  
 Extra wiping..... 24.00

**Rivets.**  
 Rivets..... 24.00  
 Rivets..... 24.00  
 Rivets..... 24.00

**Iron and Tinned, new list, Dec. 10, 1881.**  
 Iron and Tinned, new list, Dec. 10, 1881..... 24.00  
 Iron and Tinned, new list, Dec. 10, 1881..... 24.00  
 Iron and Tinned, new list, Dec. 10, 1881..... 24.00

**Copper Rivets and Burrs.**  
 Copper Rivets and Burrs..... 24.00  
 Copper Rivets and Burrs..... 24.00  
 Copper Rivets and Burrs..... 24.00

**No. 1.**  
 No. 1..... 24.00  
 No. 1..... 24.00  
 No. 1..... 24.00

**PAINTS, OILS, &c.**  
 Paints..... 24.00  
 Paints..... 24.00  
 Paints..... 24.00

**Black Lamp—Coach Painters.**  
 Black Lamp—Coach Painters..... 24.00  
 Black Lamp—Coach Painters..... 24.00  
 Black Lamp—Coach Painters..... 24.00

**Black Paint, in oil.**  
 Black Paint, in oil..... 24.00  
 Black Paint, in oil..... 24.00  
 Black Paint, in oil..... 24.00

**Blue, Prussian, fair to best.**  
 Blue, Prussian, fair to best..... 24.00  
 Blue, Prussian, fair to best..... 24.00  
 Blue, Prussian, fair to best..... 24.00

**Chinese dry.**  
 Chinese dry..... 24.00  
 Chinese dry..... 24.00  
 Chinese dry..... 24.00

**Brown, Spanish.**  
 Brown, Spanish..... 24.00  
 Brown, Spanish..... 24.00  
 Brown, Spanish..... 24.00

**Van Dyke.**  
 Van Dyke..... 24.00  
 Van Dyke..... 24.00  
 Van Dyke..... 24.00

**Dryers, Patent American.**  
 Dryers, Patent American..... 24.00  
 Dryers, Patent American..... 24.00  
 Dryers, Patent American..... 24.00

**Green Chrome.**  
 Green Chrome..... 24.00  
 Green Chrome..... 24.00  
 Green Chrome..... 24.00

**Paris.**  
 Paris..... 24.00  
 Paris..... 24.00  
 Paris..... 24.00

**Iron Paint, Bright Red.**  
 Iron Paint, Bright Red..... 24.00  
 Iron Paint, Bright Red..... 24.00  
 Iron Paint, Bright Red..... 24.00

**Purple.**  
 Purple..... 24.00  
 Purple..... 24.00  
 Purple..... 24.00

**Ground in oil, Bright Red.**  
 Ground in oil, Bright Red..... 24.00  
 Ground in oil, Bright Red..... 24.00  
 Ground in oil, Bright Red..... 24.00

**Red.**  
 Red..... 24.00  
 Red..... 24.00  
 Red..... 24.00

**Brown.**  
 Brown..... 24.00  
 Brown..... 24.00  
 Brown..... 24.00

**Purple.**  
 Purple..... 24.00  
 Purple..... 24.00  
 Purple..... 24.00

**Litharge.**  
 Litharge..... 24.00  
 Litharge..... 24.00  
 Litharge..... 24.00

**Orange Mineral.**  
 Orange Mineral..... 24.00  
 Orange Mineral..... 24.00  
 Orange Mineral..... 24.00

**Red Lead American.**  
 Red Lead American..... 24.00  
 Red Lead American..... 24.00  
 Red Lead American..... 24.00

**Venetian (Eng.) dry.**  
 Venetian (Eng.) dry..... 24.00  
 Venetian (Eng.) dry..... 24.00  
 Venetian (Eng.) dry..... 24.00

**Indian Dry.**  
 Indian Dry..... 24.00  
 Indian Dry..... 24.00  
 Indian Dry..... 24.00

**House Paint, in oil.**  
 House Paint, in oil..... 24.00  
 House Paint, in oil..... 24.00  
 House Paint, in oil..... 24.00

**White Lead, American, pure dry.**  
 White Lead, American, pure dry..... 24.00  
 White Lead, American, pure dry..... 24.00  
 White Lead, American, pure dry..... 24.00

**White Lead, English Prime.**  
 White Lead, English Prime..... 24.00  
 White Lead, English Prime..... 24.00  
 White Lead, English Prime..... 24.00

**Yellow Ochre, French.**  
 Yellow Ochre, French..... 24.00  
 Yellow Ochre, French..... 24.00  
 Yellow Ochre, French..... 24.00

**Yellow Ochre, in oil.**  
 Yellow Ochre, in oil..... 24.00  
 Yellow Ochre, in oil..... 24.00  
 Yellow Ochre, in oil..... 24.00

**Yellow Chrome.**  
 Yellow Chrome..... 24.00  
 Yellow Chrome..... 24.00  
 Yellow Chrome..... 24.00

**Zinc White, American.**  
 Zinc White, American..... 24.00  
 Zinc White, American..... 24.00  
 Zinc White, American..... 24.00

**Zinc White, English.**  
 Zinc White, English..... 24.00  
 Zinc White, English..... 24.00  
 Zinc White, English..... 24.00

**French (Paris Dry).**  
 French (Paris Dry)..... 24.00  
 French (Paris Dry)..... 24.00  
 French (Paris Dry)..... 24.00

**Oils.**  
 Oils..... 24.00  
 Oils..... 24.00  
 Oils..... 24.00

**Mischel Whale, gal.**  
 Mischel Whale, gal..... 24.00  
 Mischel Whale, gal..... 24.00  
 Mischel Whale, gal..... 24.00

**Fish Oil, Pressed.**  
 Fish Oil, Pressed..... 24.00  
 Fish Oil, Pressed..... 24.00  
 Fish Oil, Pressed..... 24.00

**Lard, Prime Winter.**  
 Lard, Prime Winter..... 24.00  
 Lard, Prime Winter..... 24.00  
 Lard, Prime Winter..... 24.00

**Linseed, Raw, in cans and bottles.**  
 Linseed, Raw, in cans and bottles..... 24.00  
 Linseed, Raw, in cans and bottles..... 24.00  
 Linseed, Raw, in cans and bottles..... 24.00

**Western.**  
 Western..... 24.00  
 Western..... 24.00  
 Western..... 24.00

**Calcium.**  
 Calcium..... 24.00  
 Calcium..... 24.00  
 Calcium..... 24.00

**Sundries.**  
 Sundries..... 24.00  
 Sundries..... 24.00  
 Sundries..... 24.00



**FRANCIS AXE CO., Buffalo, N. Y.**

Manufacturers of STANDARD and ALL-STEEL AXES.  
 Will make Special Prices on

**A X E S**

Ordered before May 1st,  
 Send for New Illustrated Catalogue. Order sample box of our New

**"BUFFALO" BEVELED AXE.**

**"Iron Clad" Lamp Stove,** Cooks, Heats, Lights.  
 SOLID RESERVOIR, Cannot Leak.  
 SUPERIOR TO ANY EXTANT.

**WEIGHT, 4 3-4 POUNDS.**

Boils quart Water in 8 minutes,  
 Bakes Biscuit in 20 minutes,  
 " Bread " 25 "  
 Broils Steak " 10 "

Reservoir enamelled; Reservoir, 6 1/2 in. long, 5 1/2 in. wide, 2 1/2 in. deep, holds quart oil; burns eight hours; Stove stands 9 1/2 in. high.

PRICE, \$10.00 per doz., packed 1/2 doz. case lots, 45 pounds to case.  
 Ovens, \$2.00 per doz.; Broilers, \$4.00 per doz.; Radiators, \$6.00 per doz.  
 Globe has two wicks, \$2.00 each, and proportionate capacity.

Get a full list of Cooking and Heating Oil Stoves with prices and Catalogue  
 THE ALFORD & BERKELEY CO., General Agts., 77 Chambers St., New York, P. O. Box 2002  
 Monitor Oil Stove Co.

**C. E. JENNINGS & CO.'S**

**Extension Lip Auger Bits**

**No. 10.**

Only the best materials used and the most skilled labor employed in the manufacture of these goods.

**Solid Cast Steel and every Bit fully warranted.**

Price per full set of 13 Bits, 3 1/2" quarters, put up in a Fancy Wood Box, with Back to hold each Bit..... \$5.00

**C. E. JENNINGS & CO.,**  
 69 Reade and 87 Chambers Streets, New York.

**THE BOSTON KNOB CO.,**  
 169 High Street, Boston.

**Reduction in Price.**

**COLORS**

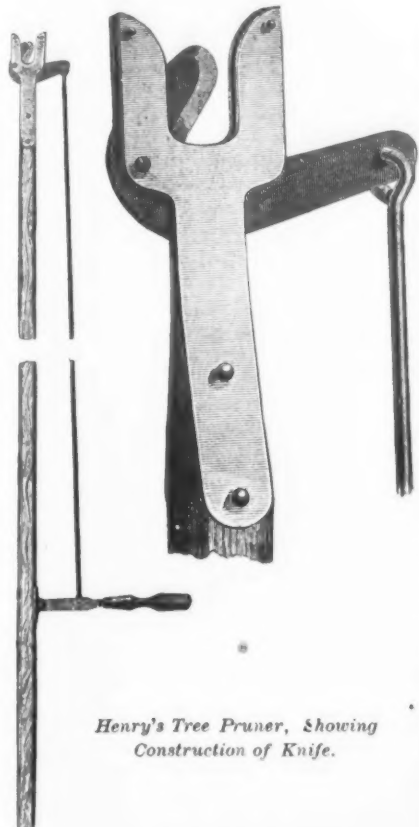
CONSIDERED MOST DESIRABLE.

3. Garnet (Dark Cherry or Mahogany).  
 7. Olive (Dark).  
 8. Olive (Light).  
 10. Drab.  
 13. Brown (Light).  
 14. Brown (Light Cherry).



## Henry's New Tree Pruner.

John T. Henry, Hamden, Conn., has recently put on the market a new tree pruner, which is represented in the accompanying illustration, Fig. 1 giving a general view of the pruner, and Fig. 2 showing on a larger scale the arrangement of the cutting apparatus. The frame is made of malleable iron, the knife being  $3\frac{1}{2}$  inches long, made of 15 gauge, best cast steel. The form of the knife is specially alluded to as being of such shape as causes it to instantly force the branch into the position in which it is most easily cut. The fact that the pruner cuts from the top instead of from the under side of the limb is a special feature which is alluded



Henry's Tree Pruner, showing construction of knife.

to as adding largely to its cutting power. The wood handle is supported by iron clips where it is attached to the frame for the purpose of giving it exceptional strength. The manner in which the pruner is operated by means of the lever and the connecting wire rod is sufficiently indicated in the illustrations. The pruner is furnished with poles, 4, 6, 8 and 10 feet in length. The frame is painted or japanned in order to afford protection against rust. The size illustrated above is adapted for branches an inch in diameter, but larger sizes for the use of telegraph men will soon be put on the market. This tool is substantially and well made, and will doubtless be appreciated for the advantages which it possesses.

## New Tools for Carpenters.

The Stanley Rule and Level Company, No. 29 Chambers street, New York, with factories at New Britain, Conn., bringing out the new goods and new attachments for old tools, which are illustrated in the annexed cuts, and which will be recognized as having

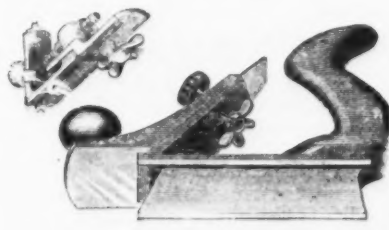


Fig. 1.—Stanley's Adjustable Chamfer Plane.

their own uses for wood-workers, and each of which has also special uses when the parts shown with them are properly attached. Referring to Fig. 2, the difficulty of plowing up to and into a hole  $\frac{1}{2}$  inch in diameter or larger, as, for example, in sash fitting, stair-work, &c., has been experienced by every wood-worker. This is overcome by the use of the tool referred to. Two interchangeable front parts go with the tools. As here illustrated the form is that of a bull-nose plow. With the other front in place it

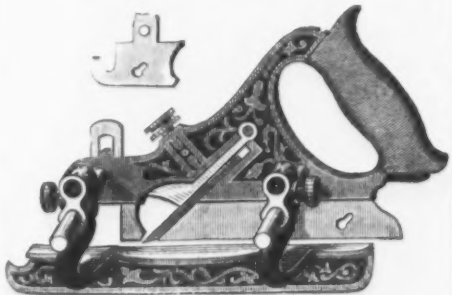


Fig. 2.—Stanley's Bull-Nose Plow and Matching Plane.

takes the ordinary form of a plow, and is adapted to all regular uses. With each tool eight plow bits ranging from  $\frac{1}{4}$  inch up to  $\frac{1}{2}$  inch are supplied, and also a slitting blade and a tongue tool  $\frac{1}{4}$  inch wide. The tool shown in Fig. 1 was illustrated in our issue for April 8, of last year. In the interval, however, some important improvements have been made. As a simple chamfer

plane it has proved itself well adapted to all common uses. An additional section is now supplied to be attached to this plane, and by it many special results can be accomplished with the same tool. For example, beading, reeding or molding a chamfer. This sort of work is in extensive demand in carpentry and in furniture making, and accordingly the tool supplies a well defined want. Six cutters



Fig. 3.—Routing Tool for Stanley's Universal Hand Bearer.

sharpened at both ends accompany this new section, embracing a large variety of ornamental forms. The Universal Hand Bearer made by this company, has been heretofore referred to by us. A new attachment has lately been added constituting it a light routing or boxing tool. The special attachment or tool is shown in the small cut, Fig. 3. This cutter, like all others in the assortment which comes with the tool, is sharpened at both ends, one end being  $\frac{1}{8}$  inch wide and the other  $\frac{1}{4}$  inch wide. It will cut a square groove of either width in any wood, and can be used to smooth the bottoms and sides for grooves which are made by a saw or any other tool. These articles, like all others made by the company, can be bought through any of the hardware houses.

## Improved Metal Spirit Level.

The Fitchburg Spirit Level Company, Fitchburg, Mass., are making a line of metal spirit levels, which are represented in the illustration given herewith. It shows the style in which their 6, 8, 12, 18 and 24 inch levels with double plumb and side sights are made. It will be observed that the frame is of iron, attention being called to the fact that it is all of one piece, so that there are no parts to become loose, while, at the same time, simplicity and economy are secured. The manufacturers allude also to the glasses as being set in such a manner that they are immovable in case of accident or in general use, without the destruction of the entire frame, there being a surface of solid iron on each side and end. The glasses are placed in such a way that the setting of one acts as a support for the others, while at the same time the point is made that they are so far independent that one can be easily removed for the substitution of another without disturbing the rest. It may be added that there is an opening in the side of the frame through which the glasses are inserted, this opening being, however, so securely closed that it is practically concealed. The durability of this level is especially emphasized

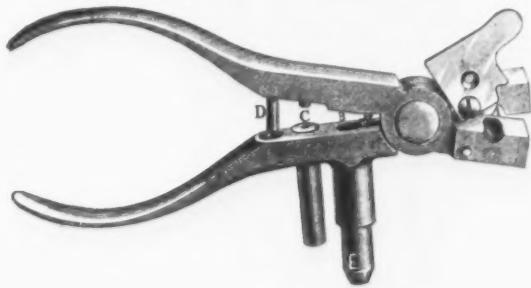


Improved Metal Spirit Level.

by the manufacturers, and the fact that it is not liable to be broken by even a much greater fall than would destroy other levels. Its accuracy and the moderate price at which it is offered are also emphasized.

## Ideal Reloading Implements.

The Ideal Mfg. Company, New Haven, Conn., have recently added to their line of reloading tools, the one which is represented in the illustration given below. It is designated as their Ideal No. 6 A. It will be observed that it is very similar to their No. 6, but is much lighter, and has a ball sizer attached. Referring to the illustration, A is the bullet mold, B loading chamber, C recapper, D bullet sizer, and E for opening mouth of shell. This implement is referred to as capable of performing all the operations required in reloading small caliber cartridges, expelling the exploded primer, reseating the new one, forcing the bullet to place, crimping the shell upon it, and thus leaving the cartridge



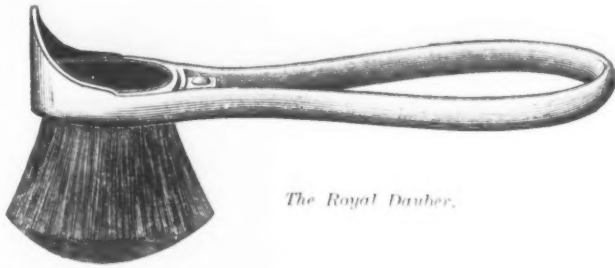
Ideal Reloading Implement, No. 6 A.

ready for use. It has also, it will be seen, a bullet mold and ball sizer. This tool is referred to as adapted to the following cartridges: 32-40 Marlin, Ballard and Winchester; 32-40 Remington; 32-35 Stevens and Maynard; 38-55 Marlin, Ballard and Winchester; 38-35 and 38-45 Stevens, &c. It is finished in nickel plate.

## The Royal Dauber.

This article is illustrated in the cut given below, which represents it about half size, the entire length of the Dauber being  $6\frac{1}{2}$  inches. It is manufactured by Peabody & Parks, Troy, N. Y. It has, as shown in the

illustration, a malleable iron frame which is tinned and which holds the bristles, which are not in small knots, but in one solid mass or knot which is held by compression firmly in the iron frame which is secured by a rivet. The great durability thus secured is

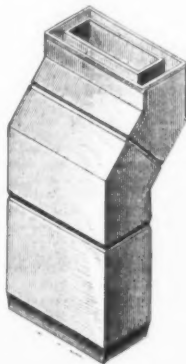


The Royal Dauber.

referred to as making the dauber practically indestructible. The fact that the bristles are bristles and without horsehair is emphasized, as well as the round face which is given to the brush, the advantages of which form are pointed out. It is also mentioned that the bristles are placed butt end in the handle, a point which is alluded to as important. It will be observed that this brush is also furnished with a scraper for removing mud from the crevices of the shoes, a useful feature, the value of which will be appreciated.

## A Novelty in Furnace Pipe.

We present to our readers, by means of the accompanying illustrations, a form of



Novelty in Furnace Pipe.—Fig. 1.—General View of Pipe, Containing a Bend.

furnace pipe manufactured by the Safety Furnace Pipe Company, and which is being placed upon the market by Rathbone, Sard & Co., of Detroit, Mich. The pipe is constructed of a good quality of bright tin plate,

seamed, and the makers claim for it convenience, safety and economy. A tinner can set the pipe in much less time than is required for the old-fashioned style, and with the foot piece shown in Fig. 2 a large saving is claimed by reason of the flow of



Fig. 3.—Cross Section of Pipe.

makers state that this form of pipe is at present being largely specified by architects in that locality, and has met with much favor at their hands. Furnacemen who make their own square partition pipe will recognize at a glance the advantages possessed by the form above described. Patents covering the construction are now pending.

## New Corrugated Conductor-Pipe.

Many of our readers have been aware for some time past that Knisely & Miller, of Chicago, have been making preparations to put upon the market a corrugated conductor-pipe which in many of its features has been intended to be superior to those which have preceded it. They inform us in a recent communication that they now have the leading sizes ready for the market, and that accordingly are in position to solicit a share of the patronage of the trade. There is comparatively little in one corrugated conductor-pipe that is different from other pipes of its class which can be shown by means of an engraving, particularly when made to small scale. However, we present a cut herewith, showing as well as we can the special features of the pipe in question. The makers direct attention to the fact that the corrugations are more evenly imparted; that they are of better depth, and that the pipe in its general



New Corrugated Conductor Pipe.

contour is more nearly round than some other pipes with which it may be compared. The leading feature, after all, however, is that the pipe is in 8 foot lengths, of one solid piece, without cross seams. The machine on which this pipe is produced is very elaborate in character, and operates upon the plan of forming the pipe tightly over a mandrel, which extends through the entire length of the section during the time that the pipe is in process of making. Accordingly, each section as it is removed becomes an exact fac simile of the mandrel, and is, in fact, an envelope stripped from it. The individual lengths of the pipe are slightly tapering, being enough smaller at one end to cause it to readily slip into the larger end of the next joint. In addition to this, each piece of pipe is provided at the large end with an extended hub, as indicated in the engraving. This pipe is being made in various kinds of material, including galvanized iron, black iron regvanized and tin plate regvanized.

## The Novelty Knife.

The Philadelphia Novelty Mfg. Company, Philadelphia, are putting on the market a hunting knife called the Novelty, the special feature of which is the manner in which the blade is connected with the handle and opens. In operating this knife it is held point downward, when, by moving the latch which holds the blade, the blade drops out to its full length and is then firmly locked. In closing the knife the operation is reversed—the point turned up and the latch drawn back—when the blade drops in, and the latch being released, the opening is securely closed, keeping the blade in and excluding dirt from the knife. The handles are made of polished cocco wood and the frame of polished malleable iron. The manufacturers claim that the best English steel is used in the manufacture of the blade. In case of the blade breaking it can be easily replaced by removing the screw at the rear and putting in a new one. When opened the large size knife measures about 9 inches,

a smaller size measures 6 inches, and the company are now at work on a  $3\frac{1}{2}$ -inch knife, which they expect to become quite popular.

## New Boring Machine.

James Swan, Seymour, Conn., for whom the Russell & Erwin Mfg. Company, of New York City, are agents, is putting upon the market a new boring machine with features to commend it to the attention of the trade. The machine is made in two forms, both of which are shown in the engravings, Figs. 1 and 2. In Fig. 1 the frame carrying the working parts is fastened rigidly in an upright position. In Fig. 2 the frame is pivoted near the base, and is provided with an adjustment by which it can be set at any angle either to the right or left of the vertical. The special features to which the maker directs particular attention include the fact that

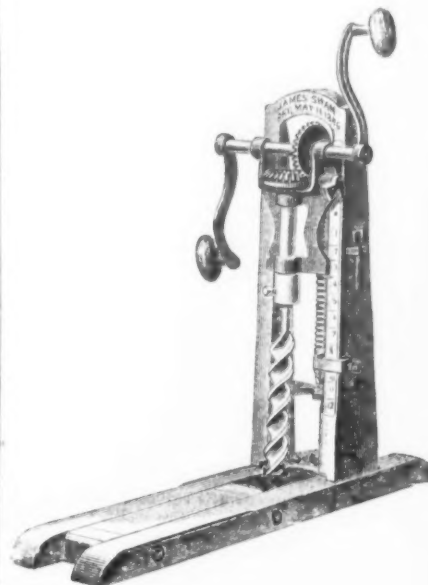


Fig. 1.—New Boring Machine, Upright Pattern.

the frame being of iron the machine is free from the objections against other forms—namely, that of warping and shrinking and getting loose so as to rattle. At the same time the entire weight of the machine is no more than that of the ordinary wooden article. By referring to the engraving it will be seen that there is a graduated gauge down the right hand side of the frame and an adjustable stop. This serves to control the depth of the hole that is to be bored. The stop may be fastened at any point that is desired. When the auger penetrates to this depth it is stopped automatically. The same motion serves to throw into gear a rack that is swung at the back of the frame, so that by continuing the motion of the handles the auger is withdrawn and is carried back to the top, where it is automatically suspended and the rack thrown out of gear, leaving the machine in condition for movement to the next hole to be bored. In the adjustable machine a graduated disk is provided at the right hand side of the frame, by means of which the machine may be set for boring at any desired angle.



Fig. 2.—New Boring Machine, Adjustable Pattern.

The machine is very simple in all its parts, thoroughly made and well adapted for the special purpose in view.

## Cover Fastener.

The Acme Flexible Clasp Company, 52 Market street, Chicago, are manufacturing a very simple, but popular, device for fastening the covers of wooden vessels. It is made of a piece of wire about 4 inches long, the center of which is flattened, while  $\frac{1}{2}$  inch of each end is bent at right angles, pointed and barbed. One of the points is driven in the top of the lid near the edge, the flat flexible center is bent over the edge, and the other point is driven in the side of the vessel. It is found to be a very useful device for packers of butter, lard, candies, tobacco, &c. Two pairs can be firmly fastened together by this clasp when placed head to head.

Seventy employees of the Bolton Steel Works, at Canton, Ohio, struck on the 2d, because of the refusal of the company to grant an advance in wages from \$1.30 to \$1.50 per day.



## Latest Legal Decisions.

## ASSAULT AND BATTERY—REMOVING PERSON WHO CAME ON BUSINESS.

B. with his client, M., went to the office of T. to pay him certain money on a contract, which R. T.'s attorney, declined to take, and sent them, B. and M., to T. But T. also declined to accept the money, whereupon B. laid it on the counter, saying: "We are going to make you take it." T. replied: "There is no use putting it there; I will not take it up." M. took the money up, and B. directed him to put it down again. T. becoming irritated, said to B. and M. that they must leave his office, but B. declared he would not go until his business was done. Then T. went to the door, and, opening it, ordered B. out, but he showed no disposition to comply promptly, and took him by the collar of his coat and by the back of the coat, and pushed him out of the door. For this forcible act, B. sued T. for assault and battery, and recovered a judgment, the court below having charged, in effect, that the plaintiff could not be put out until his business was finished, and the defendant carried the case—*Hirtenbach vs. Trowbridge*—to the Supreme Court of Michigan, where the judgment was reversed. Judge Morse, in the opinion, said: "The plaintiff had the right to go into the office of the defendant, and in a respectful way, make his tender, but after he had made it, and it had been refused, he had no right to 'make' defendant take the money; and when he was ordered out of the office, and refused to go, the defendant was justified in ejecting him, if he used no more force than was necessary. He could not, upon the plea that his business was not completed, remain and annoy the defendant. He had a license to enter the office of defendant, not being a private place, for the purpose of transacting his business with him, yet the defendant had a right, if he saw fit, not to do any business with him, and to order him from the office, which belonged to him, and was only public for the purpose of transacting his own business. A person has the right, in his private business, to control it, and may select such persons as he chooses with whom to transact such business. He can prevent whom he pleases from entering his office. And when a person, under the implied license, has entered, he has a right to request such person to depart, and he, thereafter, has no legal right to remain. A person in such business has the choosing of his customers, and his private office or business place, though open to the public for the transaction of his business with them, cannot be made, against his will, free to all to enter and remain upon proper business, like a hotel, public office, railroad car or depot. He can admit or reject whom he pleases. It is his own business, and the public have no rights therein against his wishes."

## SPECIFIC PERFORMANCE.

B. agreed with W. that he would produce and construct by his labor, skill and inventive genius certain improved machinery for manufacturing speaking tubes. These machines were to embrace and embody various new and useful improvements and inventions made and to be made by B., but no details or specifications were given in the contracts as to the form, construction or operation of the proposed machines, these matters being left to the judgment and discretion of B. W., finding that B. would not carry out the contract, brought suit to compel him to perform it instead of suing for damages, and he was defeated. The case—*Wollensak vs. Briggs*—was carried to the Supreme Court of Illinois, where the judgment was affirmed. Judge Scholfield, in the opinion, said that "the Court was quite satisfied to rest its judgment on the principles laid down by Judge Bailey in the court below, who said: 'Courts of Chancery will not entertain bills to compel the performance of contracts for personal services. Especially is this true where the services stipulated for require the exercise of mechanical skill, intellectual ability and the exercise of judgment. The ground taken by the courts for this position is, that they cannot enforce their decrees if they should make them. There is no way to compel a man to do his work—to do it skillfully, and especially to exercise his inventive skill. Imprisonment for contempt would be the consequence of a refusal to obey a decree, and that would defeat the performance sought to be enforced. Whatever remedy there is in law is at law.'"

## RAILROAD—PASSENGER TO BE EJECTED UNLESS HE PAID A SECOND FARE—TICKET AGENT'S STATEMENT.

H. bought a ticket at the station for a place on a branch line of the railway, as he supposed, but finding it to be different from the tickets he had received before he asked the station agent whether or not it was the ticket he had applied for, and he was assured that it was the proper ticket, but the conductor refused to take it on the train, as he said it was not the proper ticket, and demanded the fare. H. refused to pay, and the conductor laid his hand upon his shoulder and rang the bell, telling him that unless he paid the fare he would put him off the train. H. then paid the fare, and sued the company to recover damages for the assault and battery of the conductor, but he was defeated, on the ground that the ticket bound him, and justified the conductor. The case—*Hufford vs. Grand Rapids and I. Railway Company*—was carried to the Supreme Court of Michigan, where the judgment was reversed. Judge Sherwood, in the opinion, said: "The ticket was purchased in good faith, was genuine, and one of the agents of the road was authorized to sell to passengers. The plaintiff had a right to rely upon the statements of the agent that it was good, and entitled him to ride between the two stations. The ticket given by the agent to the plaintiff was the evidence agreed upon by the parties, by which the defendant should thereafter recognize the rights of plaintiff in his contract, and neither the company nor any of their agents could thereafter be permitted to say that the ticket was not such evidence, and conclusive upon the subject. Passengers are not interested in the internal affairs of the companies in whose coaches they ride, nor

are they required to know the rules and regulations made by the directors of a company for the control of the action of their agents and the management of their affairs. When the plaintiff told the conductor of the train that he had paid his fare, and stated the amount he had paid to the agent who gave him the ticket he presented, and told him it was good, it was the duty of the conductor to accept the statement of the plaintiff until he found out that it was not true, no matter what the ticket contained in words, figures or other marks. All sorts of people go on the cars, and the regulations and management of the company's business and trains which would not protect the educated and uneducated, the wise and the ignorant alike, would be unreasonable indeed."

## RAILROAD NEGLIGENCE.

H. sued a railroad company for damages for injuries suffered by his horse running away with him, the animal having become frightened by an extraordinary and unnecessary noise made by one of the company's engines, at a crossing which H. was approaching. H. had judgment, and the case—*Petersburg Railroad Company vs. Hite*—was carried to the Supreme Court of Appeals of Virginia, where the judgment was affirmed. Judge Hinton, in the opinion, said: "A railroad company may make the usual and reasonable noises in running their trains, but if they cause injuries by unusual and unnecessary noises they are liable for injuries caused thereby. In this case, the letting off the steam in the engine from the cylinder works, so near the crossing, in a thickly settled part of the town, the crossing being much used, was clearly a negligent act. That the engine was within the company's yard is not a sufficient excuse; the engine should have been down far enough from the crossing to avoid doing mischief by this noise. The plaintiff cannot be charged with contributory negligence in approaching the track, for he had no reason to expect that this unnecessary noise would be made."

## ATTACHMENT OF INSURANCE MONEY—OPTION TO REBUILD EXERCISED.

C. had his house and outbuildings insured, and they were damaged by fire to the amount of \$1600, which sum the company agreed to pay him unless it elected under the policy to rebuild. H., a creditor of C., attached the claim of C. as money due him before proofs of loss had been made and the loss adjusted, and the company, in answering the writ, set up these facts, and also that it had exercised its option, with the time limited, 30 days, to rebuild, and the writ was set aside. The case—*Hurst vs. Home Protection Fire Insurance Company*—was carried to the Supreme Court of Alabama, where the order was affirmed. The Chief Justice, Stone, in the opinion, said: "The stipulations of the policy were in no stronger sense a promise to pay money than they were to rebuild the house. Doing the one released the company from the performance of the other. The option of doing the one or the other was expressly reserved to the insurance company, and when it elected to rebuild and gave notice thereof, it no longer rested under an obligation to pay money unless it violated its promise to rebuild within a reasonable time. If the election were not in fact made, or not made in good faith with the intention of performing it, this would furnish ground for contesting the truth of the answer. It may be that it extends further, and would maintain an action on the case for the deceit and fraud perpetrated by such simulated election, thereby defrauding the plaintiff of his remedy. We must, however, treat the answer as true, it not being in any way controverted, and hold that no liability for C. is shown on the part of the company. It is contended here that the court below should have held the attachment alive until the rebuilding was done. Possibly, if plaintiff had moved for such an order the court would and should have granted it, but we leave that question undecided."

## Tariff of Peru.

The Department of State has received an official transcript of the tariff of Peru, which went into effect January 1, 1887. It was drawn up by a commission of Treasury and Customs officials and eight Peruvian and foreign merchants of Lima. It makes a reduction of former rates, and is limited in operation to December 31, 1888. The following are the rates on articles of metals or their manufactures:

Arms, fire, rifles, each	prohibited
Arms, sporting, each	40%
Brass, manufactures of, kilogram	40%
Bronze, manufactures of, kilogram	40%
Bullion, gold and silver	free
Clocks, each	40%
Cutlery, dozen	40%
Iron, manufactures of, dozen or gross	40%
Agricultural implements	10%
Sewing machines, each	10%
Sewing machine needles and accessories, gross 10	
Printing presses, kilogram	10%
Lead, manufactures of, kilogram	40%
Lead, ingot, kilogram	10%
Machinery for agriculture, mining, arts and trades, kilogram	0.010
Plated, britannia and gilt ware, kilogram	40%
Quicksilver and mercury, kilogram	10%
Silver, manufactures of, kilogram	10%
Steel and manufactures of, Milan steel, kilogram	10%
Table knives, razors, &c., kilogram	40%
Tin, manufactures of, kilogram	40%
Zinc, manufactures of, kilogram	10%

The following is a list of the heaviest hammers in Europe from a historical point of view:

Fr. Krupp, Essen, 1867	Tons.
Terzi Works, Italy, 1873	50
Alexandrowski, Russia, 1871	50
Cressot, France, 1877	80
Cockrell, Belgium, 1885	100
Fr. Krupp, Essen, 1885	150

The latter is now the heaviest hammer in the world.

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Bolt Headers and Upsetters.  
Automatic Opening Bolt Cutters.  
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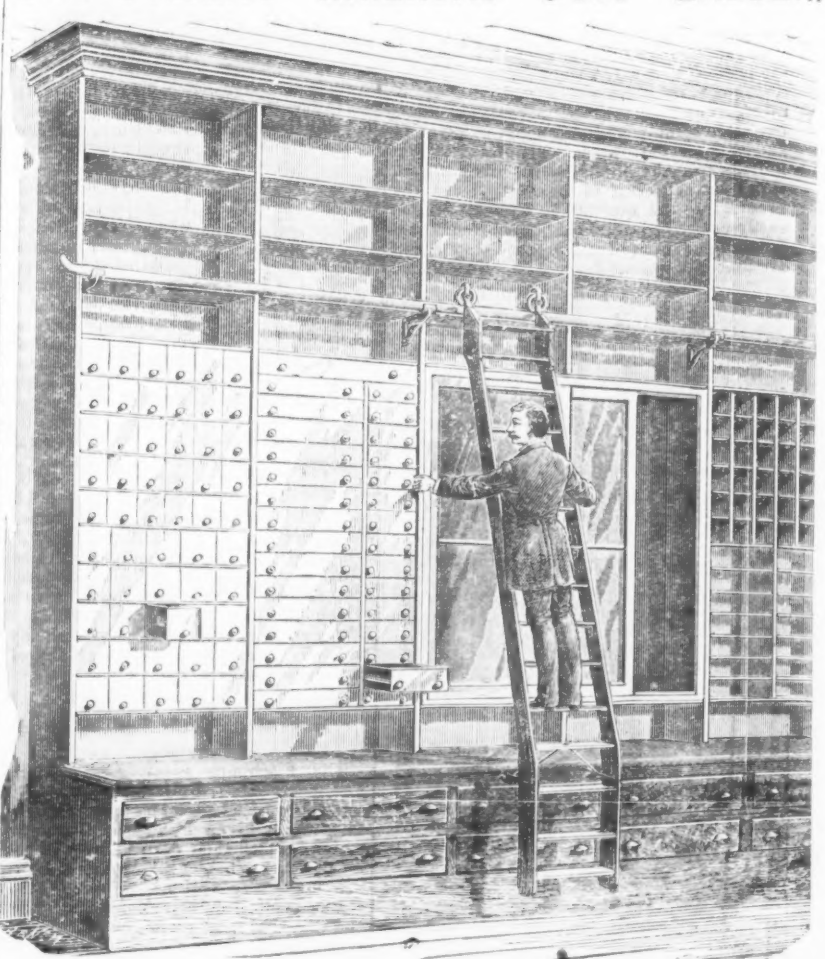
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Yours truly,  
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GENTLEMEN:—The Railroad Step Ladders we recently purchased of you are a claim for it. We regard our investment as one of the best we ever made. The ladders are always in their place, are easily moved even when persons are on them, and a slight shove sends them spinning out of the way. We would not think of getting along without them if they cost twice the money we paid for them.  
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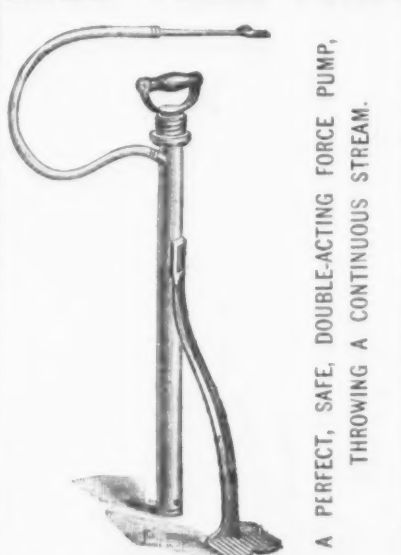
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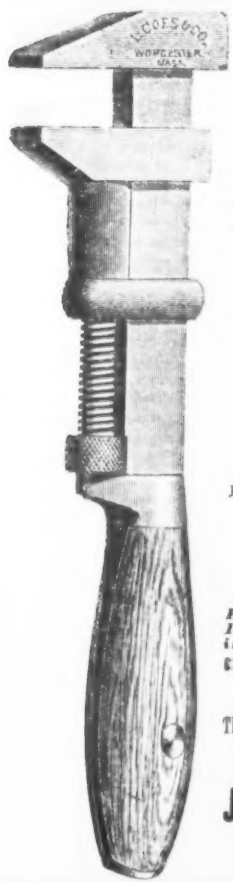
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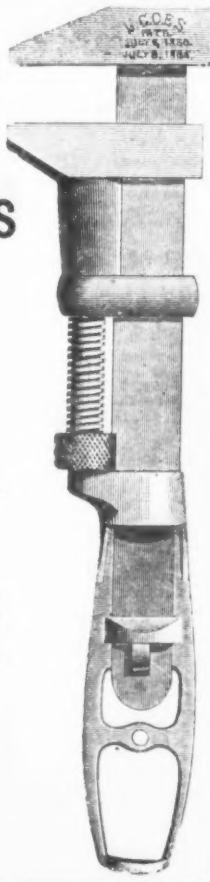
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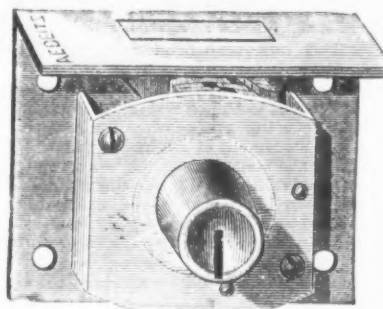
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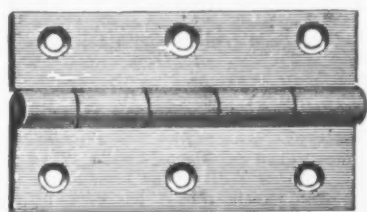
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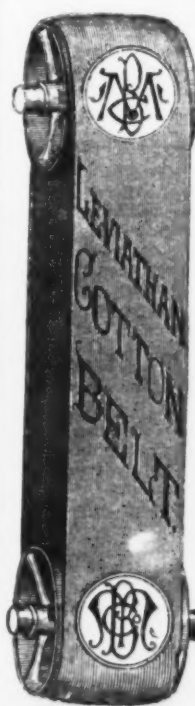
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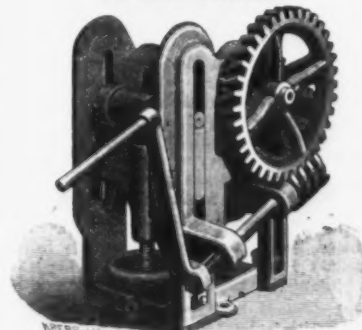
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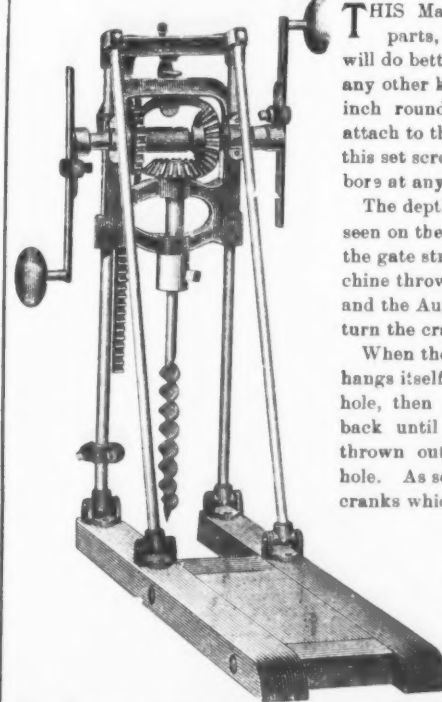
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THIS Machine has been fully perfected in all its parts, and is now sold with full warrant that it will do better work and give better satisfaction than any other kind in use. The frame is made of half-inch round steel rods; the braces are the same and attach to the rods at the top by a set screw. When this set screw is loosened, the frame falls over so as to bore at any desired angle.

The depth of hole to be bored is fixed by a stop, as seen on the left hand upright rod in the cut. When the gate strikes this stop a latch is lifted and the machine throws itself into gear by the use of a spring, and the Auger is lifted out of the hole by continuing to turn the crank in the same direction.

When the Auger is drawn from the hole the frame hangs itself up until the machine is moved to the next hole, then it is dropped down by turning the crank back until the Auger strikes the wood, when it is thrown out of gear and proceeds to bore the next hole. As seen in the cut, the machine has adjustable cranks which fully regulate its speed and power.

**PRICES:**

Machine, without Augers, - \$7.50  
Augers in sets, 18, 23, 41 quarters.  
\$3 co. \$3.75, \$6.75.  
Sizes of Augers (1, 1½, 2) (1, 1¼, 1½, 2)  
(½, ¾, 1, 1¼, 1½, 1¾, 2)

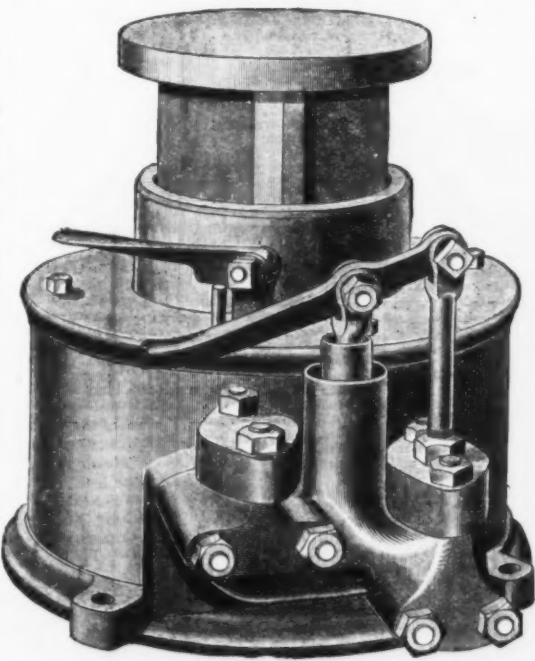
**MILLERS FALLS CO.,**  
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Nos. 20 to 26 MAIN STREET,  
**CARPENTERSVILLE, KANE CO., ILL.,**

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For pressing Hubs into Hubs, and for pressing on Hub Bands for Farm and Freight Wagons.

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Press of 50-Ton Capacity.

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Guaranteed to be the best paint made for tin, iron and wood.

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**IVES' PATENT SASH LOCKS AND DOOR BOLTS.**



A very important feature of the IVES SASH LOCK is in its securely locking when closed and simultaneously drawing the meeting rails closely together. All the movements are accomplished by cams, without the instrumentality of springs, thus avoiding the possibility of getting out of order.

IVES' PATENT DOOR BOLTS apply wholly with a bit, and are a greater protection than ordinary locks or bolts afford. Ives' Patent Sash Locks and Door Bolts are protected by nine letters patent, and are manufactured in over forty styles of finish.

**HOBBART B. IVES & CO.**  
Sole Mfrs. and Patentees 1 New Haven Conn. U. S. A.

**FLORENCE OIL STOVES**

New York Office, 27 Union Square.

ARE LIKE FEW OTHER LUXURIES, A NECESSITY AND ARE THE BEST FOR ALL PURPOSES FOR SALE EVERYWHERE MADE BY FLORENCE MACHINE CO. FLORENCE, MASS.



**MOULTON'S Improved Lemon Drill.**  
Patented June 28th, 1886.

Will extract the LAST DROP of juice from large and small lemons in five seconds.

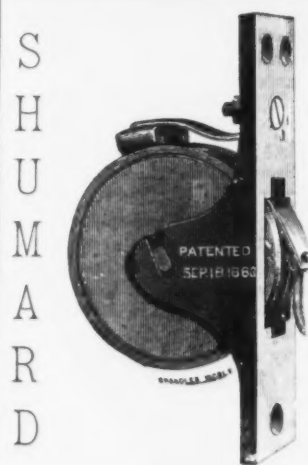
Sent by mail on receipt of 15 cents: \$1 per doz. Cash with order. Agents wanted. Ask your jobbers for them. Address patentee and sole manufacturer.

**W. F. MOULTON** Burlington Vt.

**ORE JIGS.**

The attention of Hematite ore miners is called to our new Jig. The simplest and most effective separator now in use.

**McLANAHAN & STONE,**  
Gaysport Foundry, Hollidaysburg, Pa.  
Manufacturers of Ore Washers, Screens, Elevators, Conveyors, any general Ore Mining Machinery.



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No Box Frames,  
No Weights, No Cords, No Pulleys.

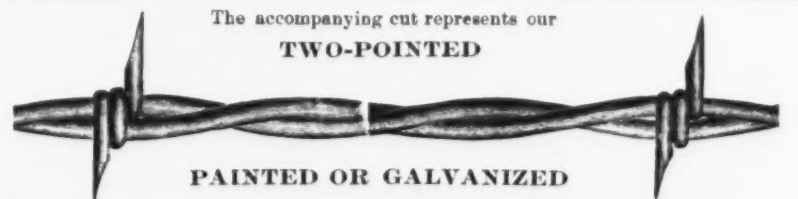
Balances the sash perfectly, and runs as easily as weights.  
Can be easily applied by any mechanic to

**ANY WINDOW,**  
and is simple, durable, reliable and practical in every way.  
SEND FOR CIRCULARS AND PRICES.

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**Barbed Fence Wire.**

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**OHIO STEEL BARB FENCE CO., CLEVELAND, O.**  
Cut of our four-pointed wire will appear next week. Prices lowest. Quality best. Correspondence solicited.

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New York Office, W. E. Sabin, 96 Chambers St.





## MANUFACTURING.

## Iron and Steel.

The Belmont Nail Company, of Wheeling, W. Va., are repairing and remodeling their blast furnace; it will not be enlarged, but will have all the late improvements for the most approved practice. They will also have two of Gordon's Whitwell-Cowper fire brick stoves, 19 x 55 feet.

The widely circulated statement that Messrs. Carnegie Bros. & Co., Limited, of Pittsburgh, have an option on, and are about to explore an ore properly near White Sulphur Springs, W. Va., is without foundation.

Mr. J. H. Sternbergh, of the Reading Bolt and Nut Works, of Reading, Pa., has purchased a site for a rolling mill at Kansas City, Mo. His intention is to manufacture bolts, nuts, railroad spikes, &c. It is understood that Mr. Sternbergh will himself take the management of the Kansas City plant, leaving the management of the Reading works to one of his sons.

It has been reported at McKeesport that the cause of the delay in operating the Duquesne Steel Works, which have just been completed, is an effort on the part of heavy stockholders of the enterprise to freeze out the smaller ones. It is promised that the new works will be put into operation by the middle of April. A portion of it could be operated now. There is no truth whatever in the above item, which should not go uncontradicted. Mr. Read, of the Duquesne Company, pronounces it to be "rubbish."

Some time ago the Portage Iron Company, Limited, of Duncansville, Pa., made a very fair and liberal proposition to their workmen, which has since been accepted, and the men are now working under it. The proposition is as follows: The company will erect a substantial hall and reading-room for the use and benefit of their employees and purchase a good library and supply the reading-room with all the leading daily and weekly papers and periodicals; also establish a relief fund for the benefit of employees in which any member who pays 75 cents monthly will receive, in case of sickness or accident, weekly benefits of \$5 monthly and in proportion as larger amounts are paid monthly, larger benefits will be paid. If these proposals are agreed to and accepted by the men, the employees are to enter into an agreement that will protect the company from strikes or demands during any contract they may make, limited to one year—the puddlers to receive Harrisburg prices and the finishing-mill men Pittsburgh prices, are regarded as fair and manifestly for the best interests of both parties.

The Pittsburgh Steel Casting Company, of Pittsburgh, manufactured in the month of March over 2000 tons of refined Bessemer steel for special purposes, a great part of it being for forging purposes. Among the Bessemer steel castings made were four 32-inch blooming mill pinions for the Robinson & Rea Mfg. Company, requiring 7 tons of metal to pour each one. The crucible casting department is running to its fullest capacity.

The Calumet Furnace, at Cummings, Ill., has been diverted to the production of Bessemer pig, on which it will work for a number of months, as Messrs. Charles Hiram & Co., of Chicago, who have control of the furnace, have large contracts on hand for this grade of iron.

The Jefferson Iron Works, of Steubenville, Ohio, under date of March 31, inform us that the report that they had purchased the plant of the Co-operative Nail Works at that place is without foundation. The new steel plant of the Jefferson Company made its first blow on Saturday, the 12th ult.

Furnace "F" of Carnegie Bros. & Co., at Braddock, Pa., has been making a wonderful record this year in the production of iron. The daily average output for the months of this year is as follows: January, 270 gross tons; February, 275 gross tons; March, 273 gross tons. The best week's output was 2161 gross tons of pig iron, on a fuel consumption of 1724 pounds of coke. The record of the above furnace, both in product and fuel consumption, stands unsurpassed.

C. N. Wilcox, of Muncie, Ind., general manager of the Muncie National Gas Company, was in Pittsburgh last week for the purpose of placing a contract for 25 miles of pipe and several thousand dollars' worth of safety fittings. Mr. Wilcox says the Muncie territory is among the most productive in the country. His company have five large wells, each having a pressure of 300 pounds.

The puddlers in the employ of the Reading Iron Works, at Reading, Pa., have been notified that their wages will be advanced to \$4 per ton.

The firms of Jones & Laughlins, Limited, proprietors of the American Iron Works, and Laughlins & Co., proprietors of the Eliza Furnaces, at Pittsburgh, which are practically one concern, have paid taxes on their property this year to the amount of \$35,000.

W. H. Everson & Co., of Pittsburgh, have nearly completed the extension to their Scottsdale Iron Works. The building is 100 x 160 feet. They are erecting a 20-inch double, three high skelp train for rolling extra wide sizes of skelpiron. The capacity of the train will be 80 tons per day on double turn. They have already in operation one new sheet mill and one new plate mill, with capacities respectively of 20 tons of plate and 7 to 8 tons of sheet per day. The skelp trains will be started up within 30 days. These will give employment to 100 new hands.

The Pennsylvania Steel Company, whose works are located at Steelton, Pa., have purchased nearly 600 acres of land on the Chesapeake Bay, 9 miles from Baltimore, at Sparrow's Point. The object of the purchase is the erection of a large iron plant, at which the Cuban ores mined by the Jurgua Iron Company, and in which the Penn-

sylvania Steel Company and the Bethlehem Iron Company have a large interest, can be smelted. It is estimated that the new plant when in full operation will give employment to 500 hands.

A party of 30 students from Cornell University were in Pittsburgh last week for the purpose of making a tour of the principal iron mills in that city.

Chas. J. Schultz, proprietor of the Iron City Bridge Works, at Pittsburgh, has just secured a large contract. It is for the supplying of the iron structure for the train sheds at Indianapolis, Ind. The sheds are 750 feet long by 190 feet wide.

A charter has been issued at the State Department, Harrisburg, for the Bellefonte Furnace Company, of Philadelphia; capital \$125,000. The directors are John Reilly and James P. Scott, of Philadelphia; Philip and Thomas Collins, of Ebensburg, and J. King McLanahan, of Hollidaysburg.

Wm. Clark, proprietor of the Solar Iron Works, Pittsburgh, is adding four new puddling furnaces to their plant, which when completed will make a total of 24 furnaces in the works.

Four double puddling furnaces and one heating furnace are to be added to the works of the Hubbard Rolling Mill Company, at Hubbard, Ohio. The plant is running double turn in all departments.

The huge fly-wheel in Carnegie, Phipps & Co.'s bar mill, at Twenty-ninth street, Pittsburgh, was torn out last week, and considerable damage was done. When the wheel got loose the machinery was scattered in all directions. One 500-pound casting was hurled to the roof and fell on a 14-inch shaft, breaking it in two. It will take two weeks to repair the damage.

Minerva furnace (coke), at Milwaukee, Wis., which has been running intermittently since 1873, will resume operations on May 1. It has been thoroughly repaired, and will employ about 175 men.

Fond du Lac furnace, at Fond du Lac, Wis., will go in operation about the 15th inst. under a new management, and with good prospects for a steady run.

The Broderick & Bascom Rope Company, of St. Louis, have been favored with some heavy orders of late, which, together with their Cincinnati cable rope contract, have compelled them to run their factory till 11 and 12 o'clock at night three or four days out of the week.

John Williams, cashier of the Crane Iron Works, at Catasauqua, Pa., has been directed by the president of the company to take charge of the affairs at the works pending the election of a superintendent.

A. J. Sweeney & Son, Wheeling, W. Va., are engaged in making a large amount of heavy ironwork for a plate-glass works to be erected near Pittsburgh. The contracts require the works to be completed ready to go to work by June 1.

The Steubenville (Ohio) Board of Improvement are considering the proposition of a party for starting a nail mill there.

Geo. A. Laughlin, formerly secretary and treasurer of the Junction Iron Company, of Wheeling, W. Va., has purchased a controlling interest in the Cleveland Axle Manufacturing Company, of Cleveland, Ohio, and has taken charge of the management as president of the concern. The company manufacture the well known Arrow Brand of carriage and wagon axles.

The sale of the property of the Fall River Iron Works Company to Mr. Lovell, of the firm of Borden & Lovell, New York, was consummated Saturday, 1900 of a total of 1920 shares being transferred at \$110 per share.

Stock was subscribed and a company organized on Saturday for the immediate erection of large rolling mills in Selma, Ala. A chain works company was organized also and the stock nearly all taken for a plant in Selma.

The Freidman Furnace Company have been organized to build a 100-ton furnace at Tuscaloosa, Ala.

The Rome Land, Iron and Improvement Company have projected a charcoal furnace at Rome, Ga.

Fayette Brown, receiver of Brown, Bonnell & Co., of Youngstown, Ohio, has filed his report of the business transacted there during February. The balance on hand February 1 was \$23,104.38. The receipts during the month were \$277,181.19, making a total of \$300,285.57. The disbursements, including pay rolls, amounted to \$261,936.32, leaving a balance of \$38,349.25.

## Machinery.

The board of directors of the Delaware River Iron Shipbuilding and Engine Company, at Chester, Pa., have elected John B. Roach president, and William Parker secretary and treasurer. Appropriate resolutions relative to the death of John Roach were passed. Operations will be pushed rapidly in the yard on the present contracts.

The Athens Foundry and Machine Shops, Athens, Tenn., are being enlarged.

The Excelsior Iron Works, located at 100 North Clinton street, Chicago, will shortly build an addition to their extensive machine shops.

At a meeting of the directors of the Weed Sewing Machine Company, Hartford, Conn., Mr. George H. Day was elected president to fill the vacancy caused by the death of Mr. J. Watson Beach. Mr. George W. Beach, son of the late J. W. Beach, was elected a director to fill the vacancy in the board. A 3 per cent. dividend, payable April 1, was declared.

It is reported that Geo. Westinghouse, Jr., of Pittsburgh, has purchased a controlling interest in the Allegheny County Light Company, which operate the arc and incandescent electric lights in Pittsburgh and Allegheny, and also supply power for

electric motors. The plant of the Allegheny County Light Company is one of the most complete in the country. The company have just completed, and now have in operation, one of the largest power plants in the country.

The Boston Belting Company have shipped to the Pennsylvania Railroad, for their new grain elevator at Philadelphia, a rubber belt 850 feet long, 36 inches wide, five-ply, which weighs about three tons. The company have also recently belted three large elevators at Buffalo, N. Y., and two at Duluth, Minn.

The Portland Locomotive Works, at Portland, Me., are very busy on orders for the Maine Central and Boston and Maine roads, and are about closing a contract with New York parties for locomotives for a Western road.

The Jarvis Engineering Company, of Boston, have received the contract through the Edison Company to set five tubular boilers with the Jarvis Boiler Setting in the Edison Company station to be erected in Tokio, Japan. They will use Sheffield grades and burn coal screenings for fuel. This class of fuel is all wasted in Japan; while good coal costs \$7 a ton, screenings can be obtained for the cost of loading and freight.

The Somersworth Machine Company, of Dover, N. H., moved into their new shops at Dover, N. H., early in the year. They have a new plant consisting of foundry, 200 x 50 feet; machine shop, 265 x 60 feet; pattern shop, 100 x 40 feet; engine-house and blacksmith shop, 60 x 40 feet; shop for cleaning castings and storing patterns, 60 x 40 feet, together with other buildings for storage of coal, iron, &c., covering a space of 200 x 50 feet, all built of brick in modern style. The equipment consists of \$40,000 worth of the most improved tools, among which is a Pond planer, 60 x 60 feet, to plane 3 feet in length, a Warren radial drill, and a variety of tools from the Niles Tool Works, Blaisdell & Co., with special tools from Philadelphia and other builders. The company make a specialty of steam-heating apparatus and machinery for grinding and polishing.

Among the recent sales made by the Wainwright Mfg. Company, of Boston, we note the following corrugated tube feed-water heaters, shipped as follows: Two to Boston, 1 each to Ryer, Melrose, Hyde Park and Warren, Mass.; Keene, N. H.; Waterbury, Conn.; Chester, Pa.; Chicago, Brooklyn, and three to New York City.

The electric light interest opens very active for this year. The Westinghouse Machine Company, of Pittsburgh, Pa., have made recent shipments to electric light companies as follows: South Side Electric Light Company, Pittsburgh, Pa., two 150-horse-power; Brush Electric Light Company, Buffalo, two of 60-horse-power (21st order); the East End Electric Light Company, Pittsburgh, Pa., two 75-horse-power (third); Hartford Light and Power Company, Hartford, Conn., two 60-horse-power; Jefferson City Electric Light Company, Jefferson City, Missouri, 60-horse-power; Portland Electric Light Company, Portland, Ore., four of 60-horse-power (seventh); Litchfield Electric Light Company, Litchfield, Ill., 100-horse-power; Cleveland Electric Light Company, Cleveland, Ohio, 75-horse-power (seventh); Canon City Electric Light Company, Canon City, Colo., 60-horse-power; Olney-Edison Electric Light Company, Olney, Ill., 60-horse-power; Jenney Electric Light Company, Fort Wayne, Ind., three of 15-horse-power.

The Hill Clutch Company, of Cleveland, will enlarge their present works to accommodate their rapidly increasing business. They are making a number of special machines to cheapen the cost of their Hill clutches, and have prepared new special machinery to manufacture their new Hill clutch "B."

The Brush Electric Light Company, of Buffalo, have now 21 Westinghouse engines of 60-horse-power each in their station.

The extensive cotton-seed oil and fertilizer mills at Raleigh, N. C., burned March 27. The new oil mill was built last year. Its capacity was 2400 gallons daily, while the capacity of the fertilizer mill was 75 tons daily. Last autumn the mills were acquired by the Cotton-Seed Oil Trust, which operated them day and night to their full capacity. The loss is \$50,000.

The Guernsey Furniture Company, St. Louis, Mo., are putting in a 100-horse-power Westinghouse engine, as are also the Haydock Bros., manufacturers of carriages.

The Mason Regulator Company, of Boston, report a large sale for their reducing valves. Among the orders recently placed are: Hyatt Water Filter Company, Newark, N. J.; Connecticut River Railroad, Springfield, Mass.; Martin Anti-Fire Car Heating Company, Brooks Locomotive Works, Dunkirk, N. Y.; Louisiana Sugar Refinery, Southern Brewery, Louisiana Brewing Company, J. Keller Soap Works, New Orleans, La.; Arkansas Oil and Compress Company, Texarkana, Tex.; Standard and Bay State Sugar Refinery, Boston, and Middlesex County Jail, East Cambridge, Mass.

The Norfolk and Western Railroad Company have ordered the construction of 18 locomotives at the Baldwin Locomotive Works as early as possible. They are needed for the increased traffic over the road.

The Bridgeport Forge Company recently purchased a 12,000 pound steam trip hammer from the Delaware Shipbuilding Works.

## Hardware.

The Manhattan Hardware Company, of Reading, Pa., report that the demand recently made by their employees for an advance in wages will not be granted. They report the volume of business very large, but prices are very unsatisfactory.

The Hero Fruit Jar Company, Philadelphia, are running overtime in their large establishment, the 750 hands employed by them making about eight days per week. Besides fruit jars their trade in sheet and

white metal goods, such as oilers, tops for casters, bottles stoppers, and goods in that line shows a rapid increase.

Wilson Bros., Easton, Pa., who make a specialty of grinding mills, have recently enlarged their machine shop, making it 40 x 50, three stories; their factory being 40 x 70, three-story brick. They have also put in a 50-inch turbine-wheel.

The glass oil can manufacturers of the United States held a meeting in the Monongahela House, Pittsburgh, on the 30th ult. The following firms were represented: Mr. D. C. Hemingway, of the Hemingway Glass Company, of Covington, Ky.; W. M. Campbell, of the Adams and Westlake Company, of Chicago; Charles E. Meier, of C. Reisner & Co., of New York; T. C. Ball, of Ball Bros., Buffalo, N. Y.; Mr. Wormser, of Wormser & Co., Pittsburgh; Mr. R. L. Walker, of R. L. Walker & Co., of Canton, Ohio, and Mr. McLaughlin, of the Point Bottle Works, of Rochester, Pa., besides representatives of three other firms, every factory in America being represented. The chief business was to perfect the organization which was formed last September. L. H. Harker, of Columbus, was elected president, and W. N. Campbell secretary and treasurer. A resolution was passed to adopt a uniform schedule of prices.

It is reported that a wire nail factory will shortly be established at McKeesport, Pa. A stock company is to be formed with a capital stock of \$60,000.

The Southwark Scale Company, Philadelphia, report a brisk trade, especially from the Pacific Coast, which has been the heaviest they have experienced for several years past. They have enough orders for their I. X. L. combination counter scale to keep them busy for two months. They have recently, at considerable expense, erected a plant for the manufacture of scales made of one piece of metal, to be used in all the different varieties of scales manufactured by them.

The Waterbury Malleable Iron Company, recently formed, occupy the building of the late A. Burrill Hardware Company, Waterbury, Conn. New machinery has been added, and the foundry capacity greatly increased for the manufacture of cast and malleable iron fittings. Pancoast & Rogers, Gold and Platt streets, New York, are the general sales agents.

The Sequatchie Hoe & Tool Company, to be located at South Pittsburgh, Tenn., was organized March 15. J. R. Norton was chosen President; J. P. W. Brown, Vice President, and Louis R. Eastman, Secretary and Treasurer. The company were organized for the purpose of manufacturing solid eye and handled planters' hoes, picks, mattocks, and general mining and railway supplies. The capacity of the works is estimated at 40,000 to 50,000 dozen finished tools per annum, and the number of employees between 65 and 75. The factory was the Ironton, Ohio, Hoe & Tool Company, and was moved to South Pittsburgh.

The T. C. Richards Hardware Company, of Winsted, Conn., are reported to be making plans for another enlargement of their factory. The plan consists in the removal of the old wooden building, and the extension of the new brick building to cover the ground now occupied by the old one. The addition will be uniform with that already built.

## Miscellaneous.

The formation of the Pittsburgh railroad coal operators into an association is finally accomplished. At a meeting last week 31 firms signed the agreement. They represent a capital of \$12,000,000. Each member pays an initiation fee of \$25. The officers are as follows: President, T. B. Robbins; vice president, Wm. McCleary; and secretary, Alex. Dempster. An executive board was formed, which consists of one member for each firm in the association. The objects of the association have already been explained.

The works of the Hubbard Tinning Company, at Hubbard, Ohio, the first of their kind in the United States, will commence operations during the present month. The company have received a large consignment of block plate from Swansea, Wales. R. J. Hutchings, a well-known tinner and inventor from Wales, will be general manager.

A dispatch from Wheeling, W. Va., dated March 30, says: "The La Belle Pottery Company, with a capital stock of \$75,000, were organized this afternoon. The money was subscribed in one hour, a factory site bought the next, and Monday ground will be broken for a five-story building 100 x 300 feet in dimensions. The new pottery will have eight large kilns and eight decorating kilns, and will employ 400 hands."

The stockholders of the Pennsylvania Natural Gas Company, of Pittsburgh, held a meeting in Philadelphia on the 30th ult., at which the capital stock was increased from \$1,000,000 to \$2,000,000, the proceeds to be devoted to extending the plant.

The shipbuilding firm of Wolf & David, of Milwaukee, Wis., have been offered to acres of land by a South Chicago land syndicate if they will locate their shipyard at that point. In view of possible changes at Milwaukee which will affect the firm's shipyard, it is reported that they look favorably on this proposition, should a removal to some other location be necessary. Most of the iron, steel and timber used in Milwaukee shipyards passes through Chicago.

C. H. Bundy, representing the Ohio Iron Wheel Company, of Hamilton, Ohio, has submitted a proposition to the citizens of Fort Smith, Ark., that if they would take stock to the amount of \$25,000, his company would establish a branch plant of their factory in Fort Smith, with a capital of not less than \$50,000, for the manufacture of agricultural implements.

The Muskegon Car Company have leased the works of the late Muskegon Car and Engine Company, at Muskegon, Mich., which have been idle for about two years, and will have them in operation within 30 days. These works have a capacity of 10

freight cars per day, being supplied with the requisite machinery and appliances to do all the work except casting the wheels. They have an advantage in being situated in the Norway pine region on two lines of railroad, the Chicago and West Michigan and the Grand Rapids and Indiana, with two other railroads about to establish connections there. They are prepared to take orders for cars for early delivery. The capital of the new concern is \$100,000. President, John Torrent, of Muskegon; vice-president and treasurer, Herbert Royston, of Chicago; general manager, L. C. Burgess, of Chicago; directors, John Torrent, Hugh Park, D. H. Donovan, L. C. Burgess and Herbert Royston.

## The National Bank Tax Cases.

The United States Supreme Court has rendered its decision in the National bank tax cases, involving the right of a State to tax National bank shares at a higher rate than the rate of taxation imposed upon savings banks, trust companies, insurance companies, &c. The court rendered its decision adverse to the claims of the banks in every point involved. Some time ago a motion to advance these cases was granted, on the ground that an immense amount of money was involved, and that a decision by the Supreme Court on the questions presented would be accepted by the National banks of New York and elsewhere, and the whole subject disposed of, thus preventing an immense amount of litigation.

The case of the Mercantile National Bank of New York City vs. the Municipal Authorities and Tax Receiver of New York was the first case decided, having been agreed upon as a test case, by which the action of all the New York banks would be governed. The case comes up in the form of a motion to reverse the decision of the New York court dissolving an injunction restraining the collection of taxes assessed upon the stock of the New York national banks. Judge Matthews rendered the decision, affirming the action of the New York court. He reviewed at great length the previous decisions of the Supreme Court on the general subject of taxation of moneyed capital. This case, he said, depended upon the construction to be placed upon the clause in Section 519 of the Revised Statutes, providing that State taxation of national bank shares shall not be at a greater rate than is assessed upon other moneyed capital in the hands of the individual citizens of such State. The manifest purpose of this statute was to protect national banks from a system of burdensome and unjust taxation imposed upon them by unfriendly States, and in the interest of other organizations transacting similar business under State or local organization. The law did not refer to all forms of moneyed capital, but to moneyed capital so invested as to be brought into competition with that invested in the business of national banks and to be performing similar functions. The court holds that the complainants in this case failed to show that they were suffering from any such unjust or unfriendly discrimination in favor of other institutions, organizations or moneyed capital so invested, or so acting as to be in competition with them. It could not be claimed that insurance companies and similar organizations were in such competition. It had been repeatedly held that trust companies were not, and the aim and purposes of savings banks were so different that no competition could be claimed.

In other cases complained of the present rates of taxation were clearly within the authority of the State, and not in violation of this law. It was the purpose of the law and the duty of the court to protect capital invested in National bank shares from unjust discrimination in the form of State taxation higher than that imposed by the State on other moneyed capital invested in similar and competing business; but such a case was not shown, in the opinion of the court, and no ground was seen for interference. A similar decision was rendered in the case of the National Newark Banking Company vs. The City of Newark on the same grounds.

Erroneous telegraphic reports have been transmitted over the country concerning the recent differences between the North Chicago Rolling Mill Company and the blast furnace employees at South Chicago. The facts are as follows: The questions at issue were submitted to a board of arbitration, composed of John Jarrett, for the company, William Muldoon, for the employees, and O. D. Wetherill as umpire. The demands of the men were for 15 per cent. advance to the iron carriers and 10 per cent. to all the other men; also that the blast furnaces be stopped during the long turn, which is every alternate Sunday, and that the employees be paid time and one-half for Sunday work, and time and one-half while engaged in cleaning flues, and that the iron carriers and helpers be given an extra man while running iron into the pig beds. The decision of the board gave the men a uniform advance of about 6 per cent., and granted them the extra help while running iron into the pig beds, and time and one-half for the men engaged in cleaning flues, but all other points were decided against the men and in favor of the company.

A strike for more pay has taken place among the plumbers of Cleveland, so that 160 hands are now idle. Three months ago the Journeymen Plumbers' Association, who have a membership of 90, gave notice that April 1 they would demand \$3.50 per day of eight hours, also that all workmen be paid equal wages, and that any man or boy who used tools, no matter how long he had worked at the trade, should receive not less than \$3 per day. The master plumbers refuse to make these concessions, and have paid off their men, at the same time explaining the situation to their customers, who are assured that the strikers' places will soon be filled.

The Port Chester Bolt and Nut Company, Port Chester, N. Y., are building an extension to their works, which is to occupy 72 x 36 feet, and will be used for the general purposes of their business.









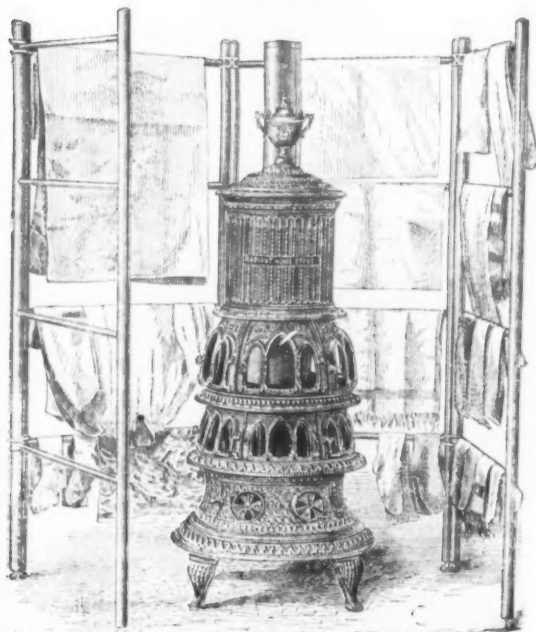


# THE F. F. ADAMS COMPANY, ERIE, PA.

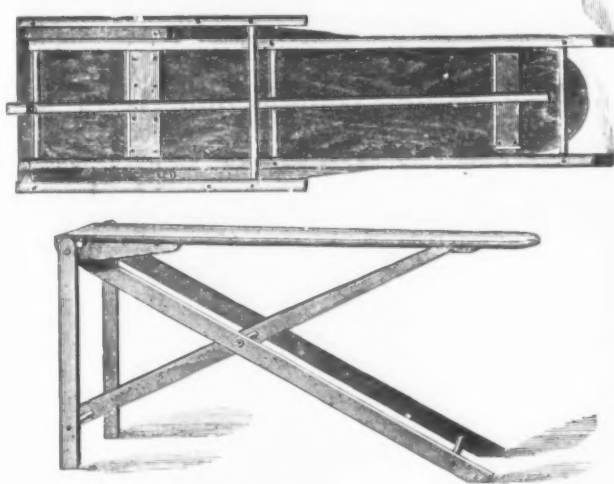
## Patent Household Articles.

SEND FOR ILLUSTRATED CATALOGUE.

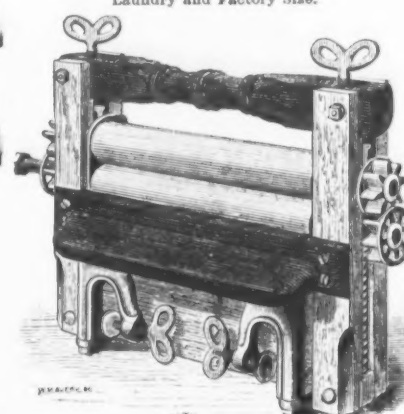
Reversible Clothes Horse.  
PATENTED.



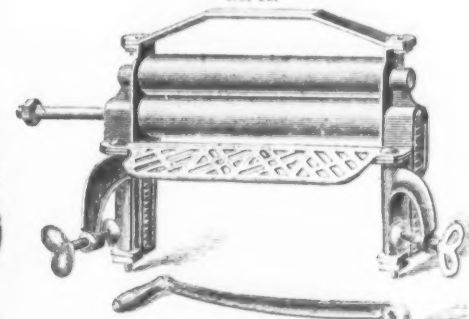
Adams Ironing Table.



Keystone Wringer.  
Laundry and Factory Size.

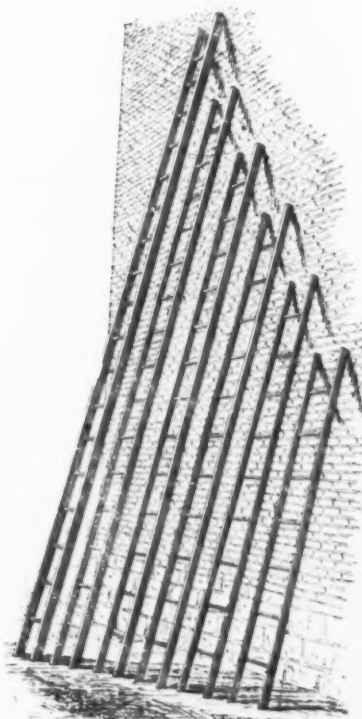


Our New Style.  
No. 11.



Adams Swing.

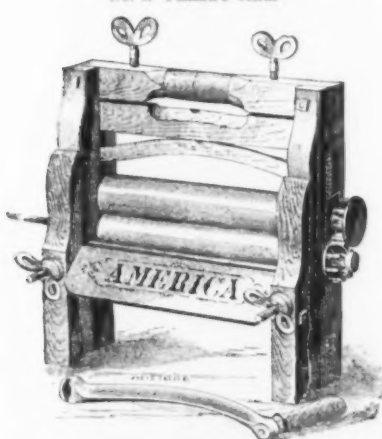
Common Ladders.  
From 10 to 20 Feet.



Keystone Double Bench Wringer.  
Price to the Trade, \$48.00 per Dozen.

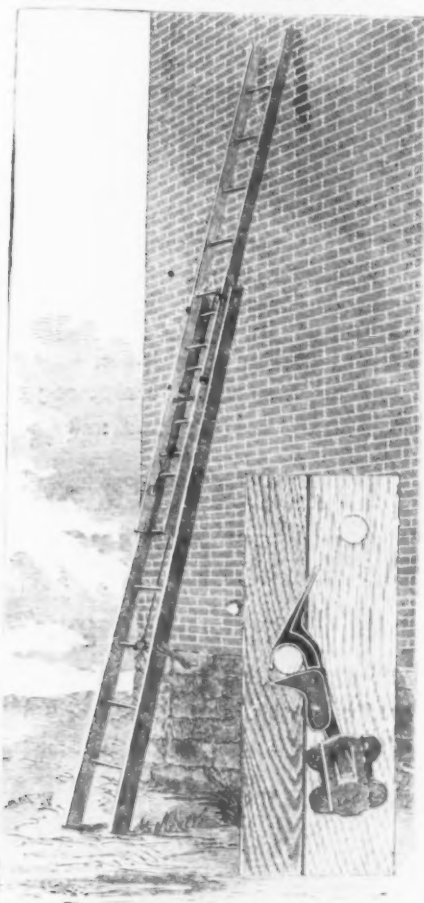


The American Wringer.  
No. 8. FAMILY SIZE.

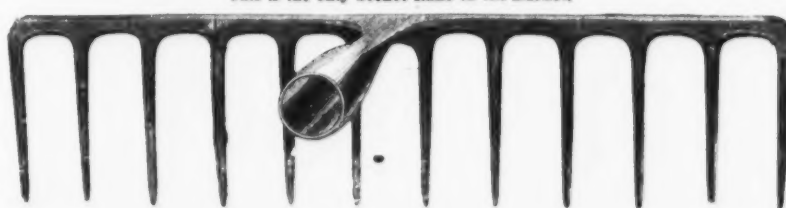


Lovell's Lock-Hinge Step Ladder.  
Patented April 10, 1872, and March 11, 1873.

Lovell's Patent Extension Ladder.  
Patented October 22, 1867, and August 4, 1874.



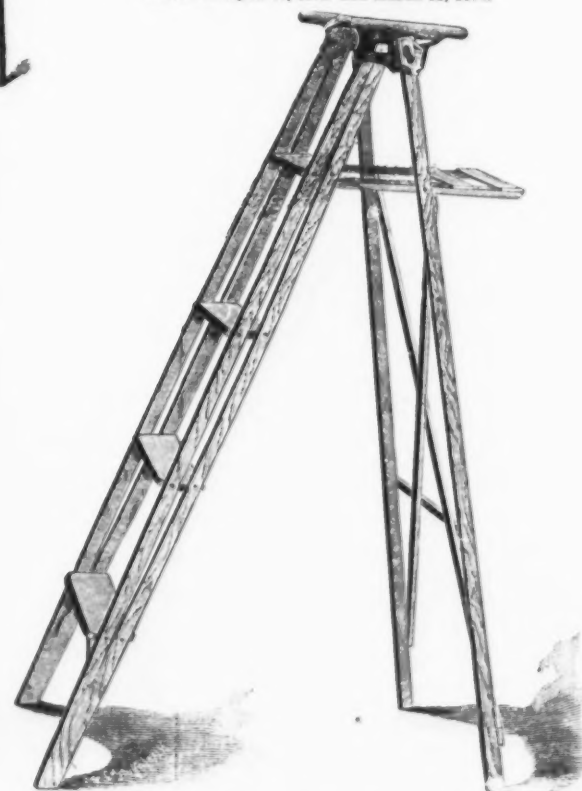
Keystone Socket Rake.  
This is the only Socket Rake in the market.



Ideal Mouse Trap.



Cyclone Mouse Trap.  
Patented November 6, 1883.

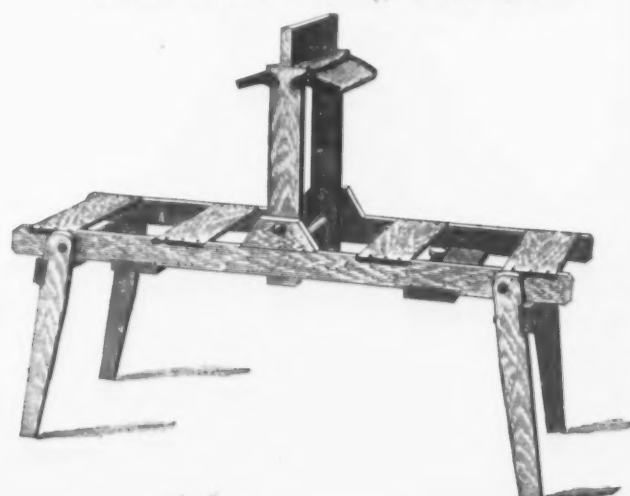


Adams Platform Truck.  
SIX WHEELS.

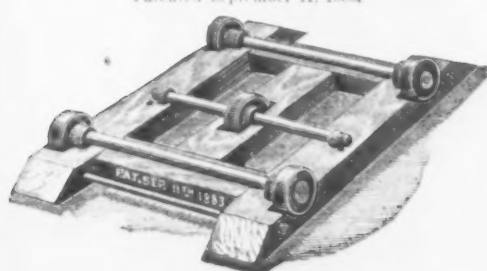
The Jungbluth Lawn and  
Street Sprinkler.



Adams Double Folding Wash Bench.



The Adams Iron Wheel Truck.  
Patented September 11, 1883.





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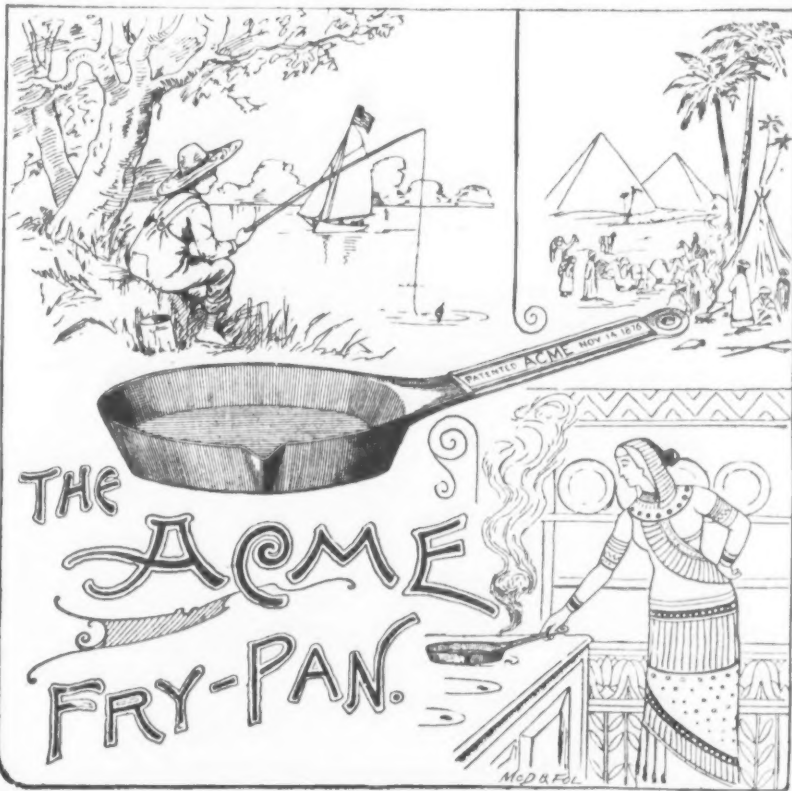
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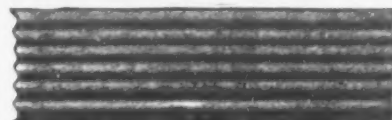
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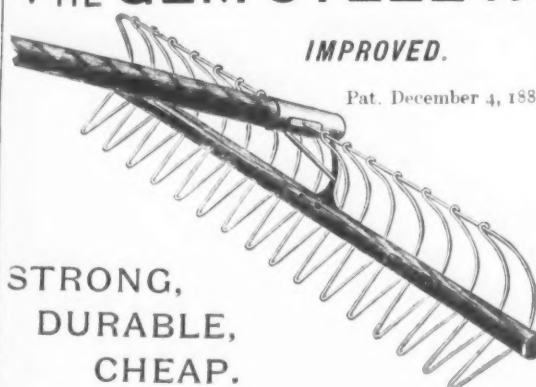
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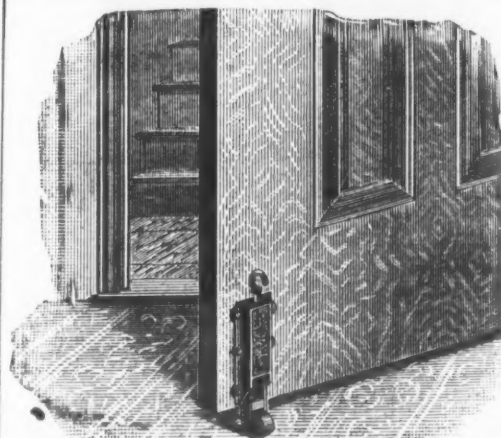
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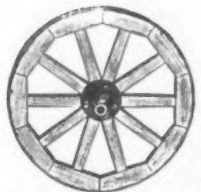
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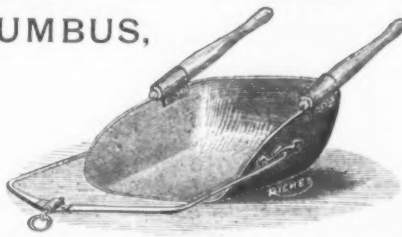
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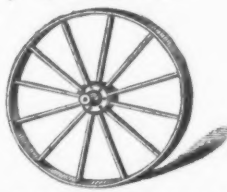
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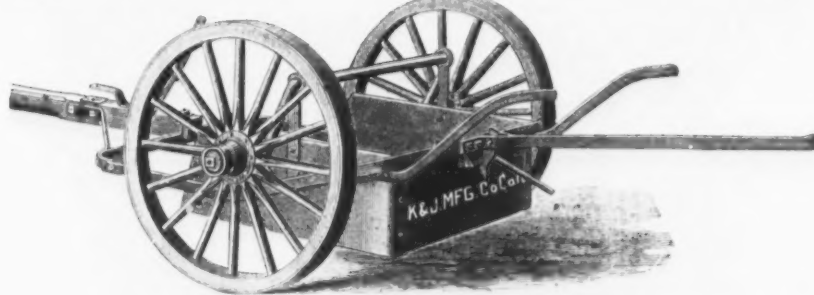
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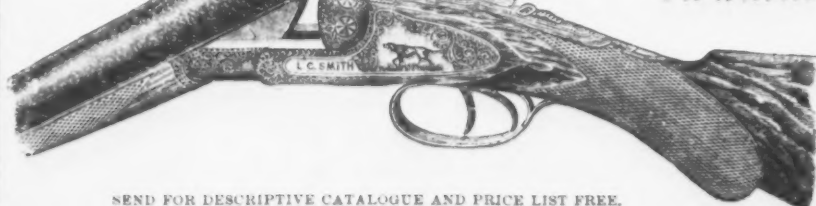


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**Door Screens**

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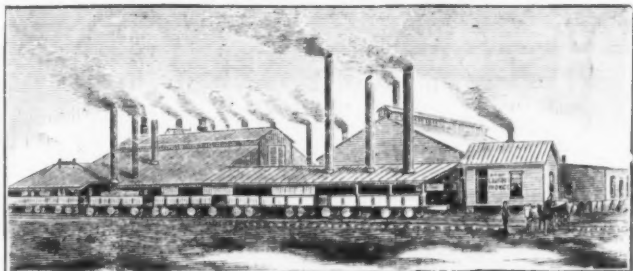
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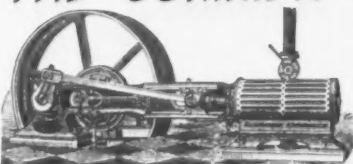
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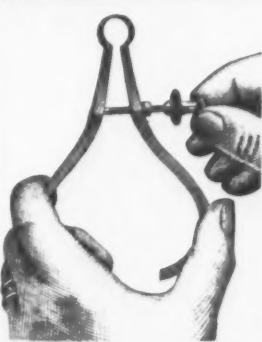
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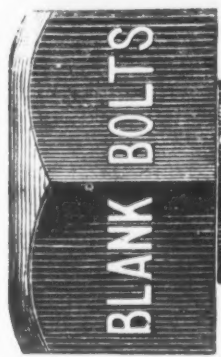
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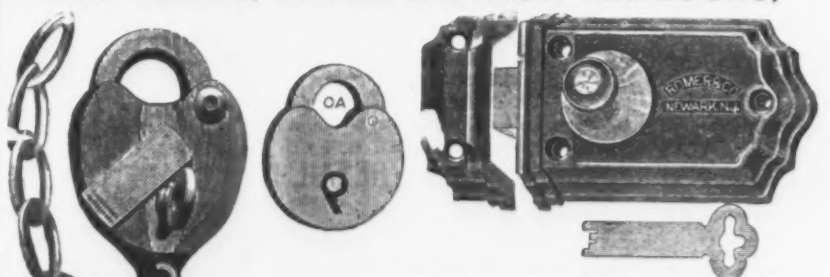

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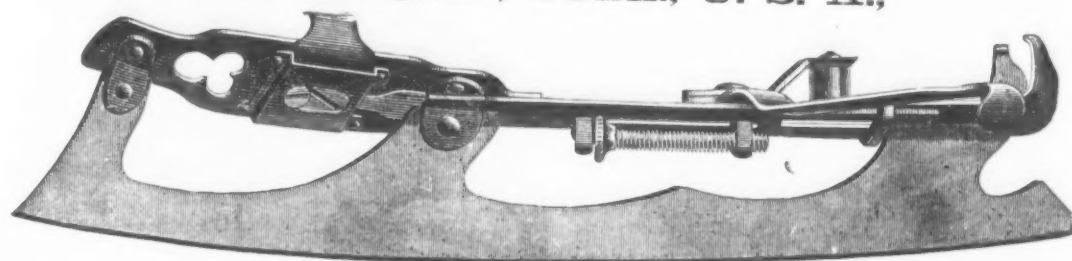
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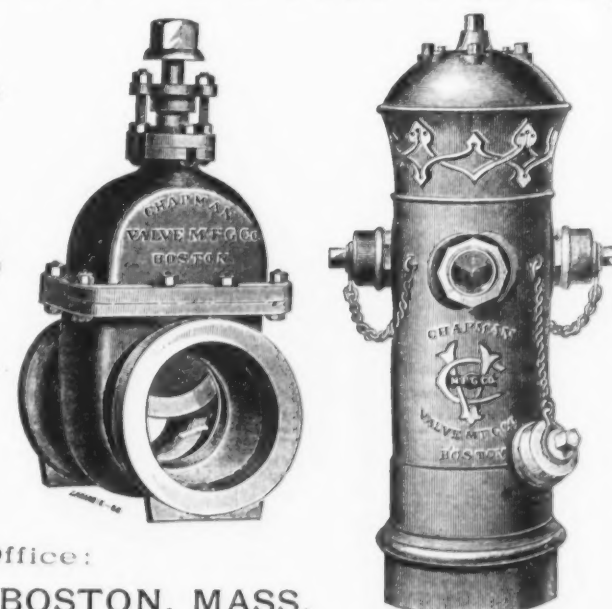
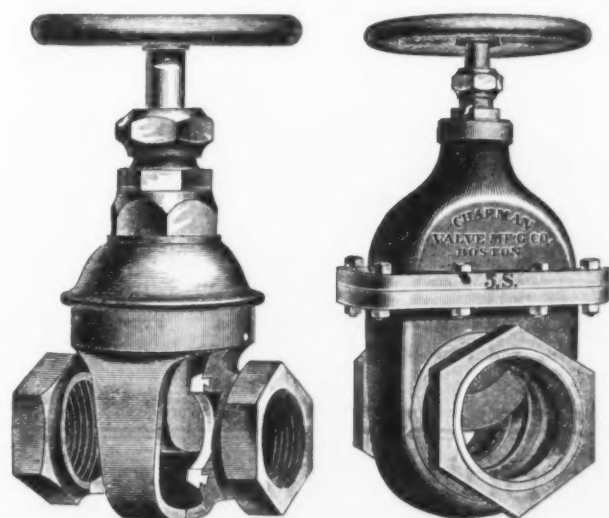
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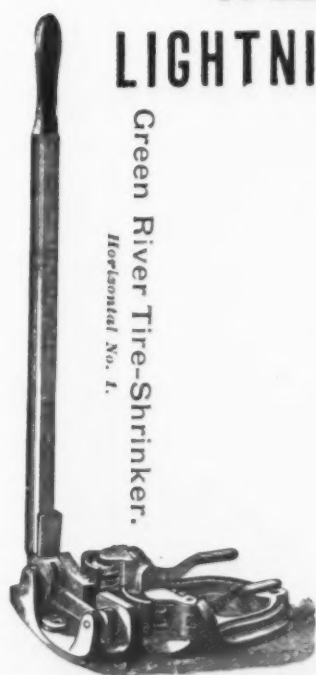
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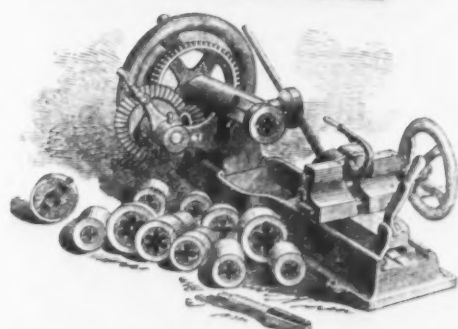
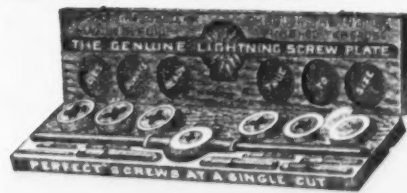
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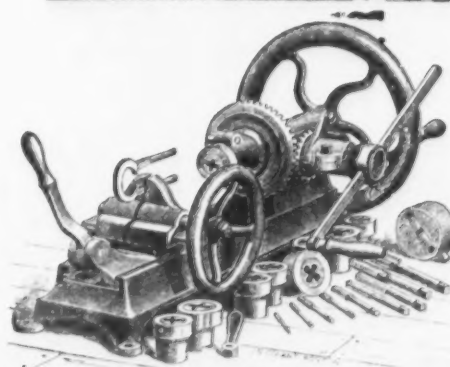
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No. 0.—For Tires 3/8 x 2 inch.  
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To those who are in the market for Castings:

We should be pleased to have you send us drawings, cuts or sketches, or preferably samples of the castings you are using and allow us to quote you our prices. It would be still better to forward patterns with a small trial order on which we will agree to make a satisfactory price. We are confident of our ability to produce castings of the finest quality known to the trade at reasonable prices. We use only the best obtainable materials and approved modern appliances. We employ only steady and intelligent skilled workmen, paying them good wages. While this may make our castings cost more per pound than those of cheap material and poor workmanship, we will guarantee ours to be much less expensive to the user in the end, because of their proper weight and the time and labor saved in the drilling, planing, turning, filing or other finishing. We prefer the reputation of being a high-priced house which does only the very best work to the name of a cheap producer of rough, hard and low-priced castings, out of shape or of heavier weight than the patterns call for. It is astonishing to notice how



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We have lately had the unsolicited testimony from a customer in London, to whom we had shipped some light iron castings, that his workmen were able to finish our castings in one-third the time they required to do the same work on castings from similar patterns made in England!

We have facilities for wood and metal pattern making, drilling, polishing, plating, japanning and the manufacture of hardware and light machines by contract.

Machinery Castings, Light or Heavy.

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Freight paid to principal points in New England and New York.

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**"THE BEST."**

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**PENNSYLVANIA HORSE LAWN MOWER.—Open Cylinder.**

Showing Mower with Seat and Spring, Shafts and Handles. Draft Irons Detached.  
Width of cut 30 inches. Weight, 320 lbs.

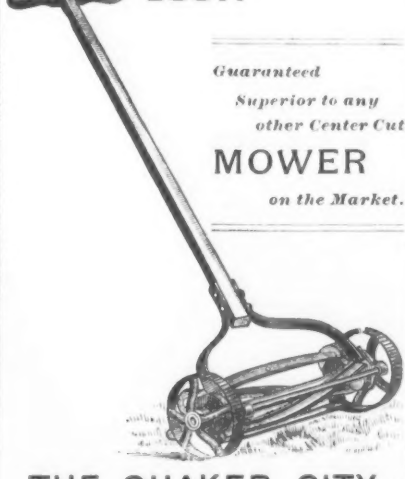


Horse Mower, Open Cylinder, 30 inch Cut, with Handles and Draft Irons, - - - \$110.00  
Extra for Seat, Spring and Foot Board, - \$8.00 | Extra for Shafts, - \$7.00  
We recommend the Mower with Draft Irons only. Discount on Horse Mowers is not same as on Hand Mowers.

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The trade will soon find an ordinary and roughly-made Reel of blades and stationary knife is not all that is required to make a perfect Lawn Mower.

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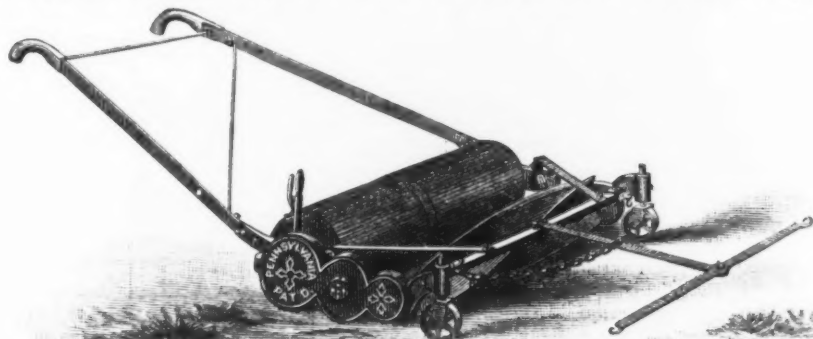
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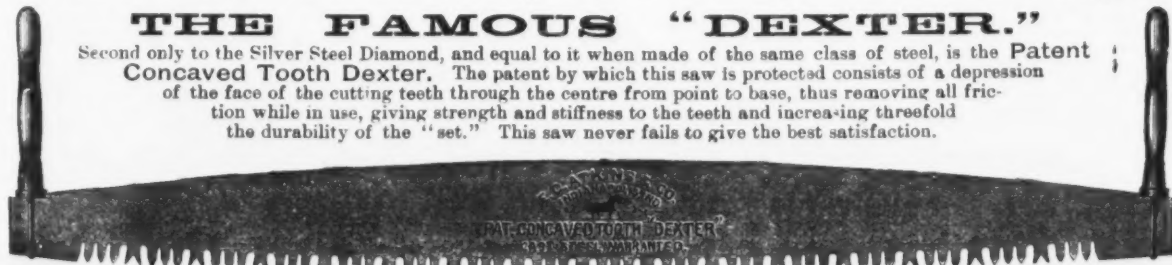
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Second only to the Silver Steel Diamond, and equal to it when made of the same class of steel, is the Patent Concaved Tooth Dexter. The patent by which this saw is protected consists of a depression of the face of the cutting teeth through the centre from point to base, thus removing all friction while in use, giving strength and stiffness to the teeth and increasing threefold the durability of the "set." This saw never fails to give the best satisfaction.



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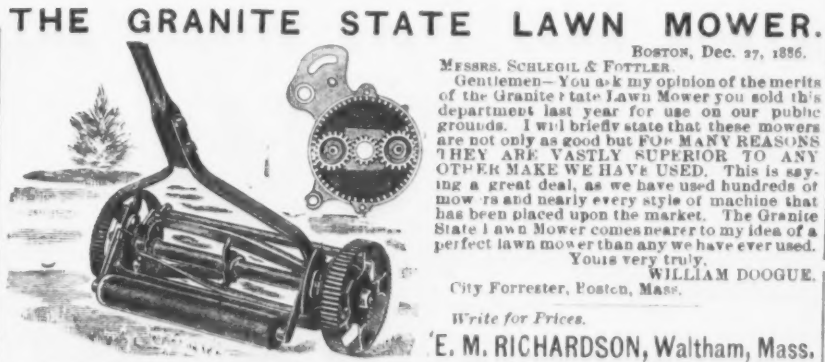
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Boston, Dec. 27, 1886.  
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Gentlemen—You ask my opinion of the merits of the Granite State Lawn Mower you sold this department last year for use on our public grounds. I will briefly state that these mowers are not only as good but FOR MANY REASONS THEY ARE VASTLY SUPERIOR TO ANY OTHER MAKE WE HAVE USED. This is saying a great deal, as we have used hundreds of mowers and nearly every style of machine that has been placed upon the market. The Granite State Lawn Mower comes nearer to my idea of a perfect lawn mower than any we have ever used.  
Yours very truly,  
WILLIAM DOOGUE,  
City Forester, Boston, Mass.

Write for Prices.  
E. M. RICHARDSON, Waltham, Mass.

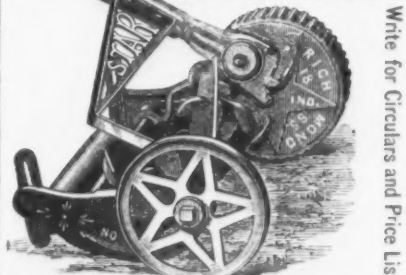
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**LAWN MOWER.**

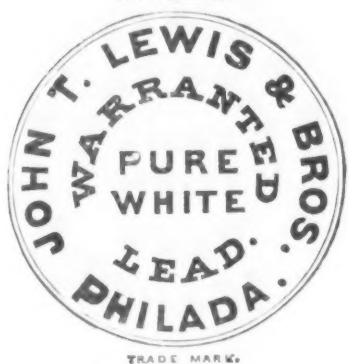
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Leaves no grass to be cut with a sickle.

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are of the ordinary Side-Wheel pattern. They are con-  
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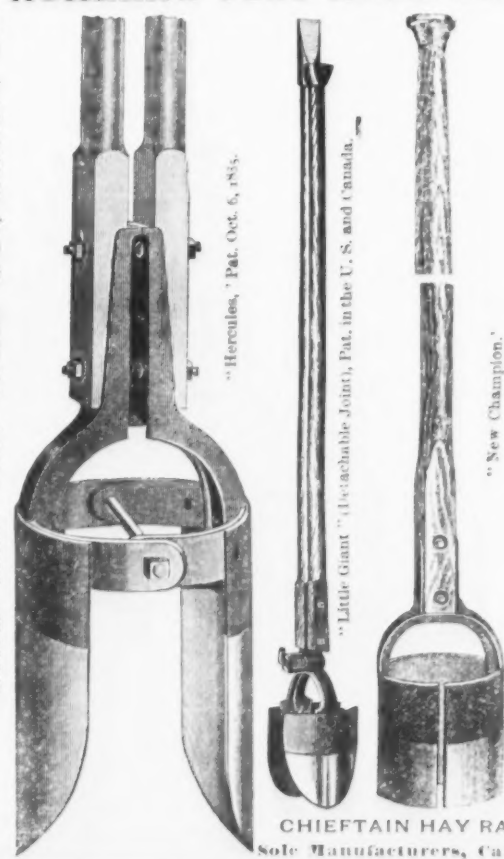
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Provided with Automatic Shell Extractor, Rebounding Lock.

Calibres 32 and 44

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Weight 18½ oz.

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*Cheapest and best in use.*

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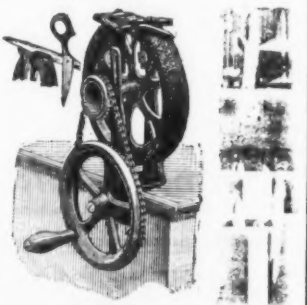
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To make a coarse or fine spray turn the adjustable screw on top. This Sprinkler makes the most beautiful fountain yet invented. Requires no attention, and is sold at a price within the reach of all.

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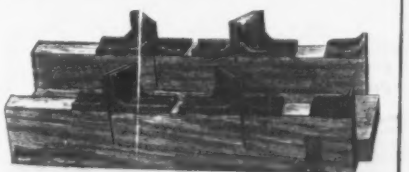
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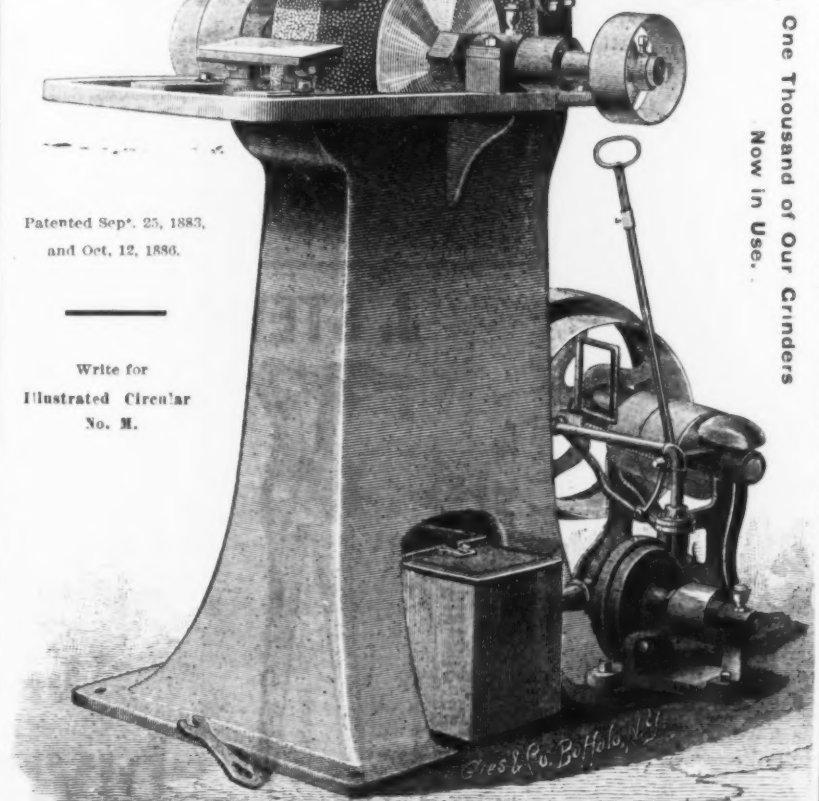
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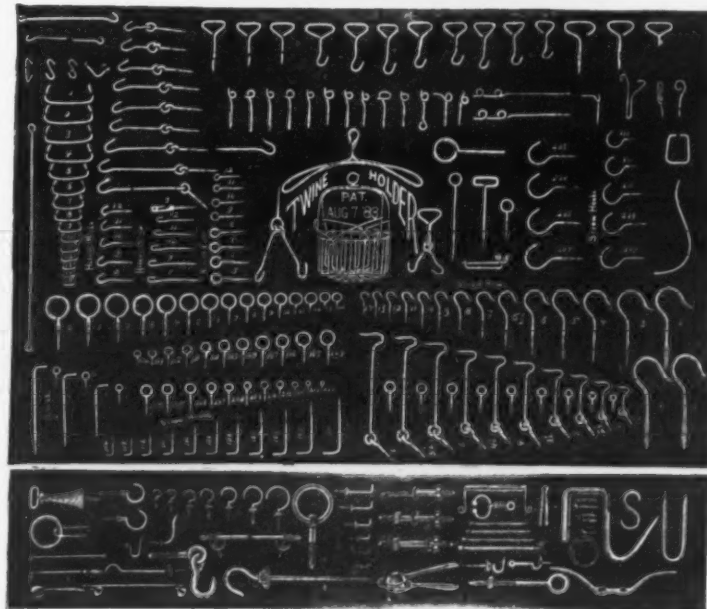
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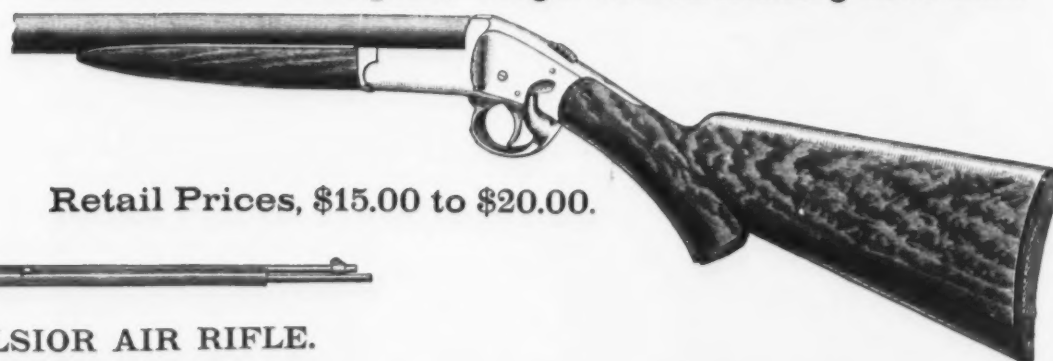


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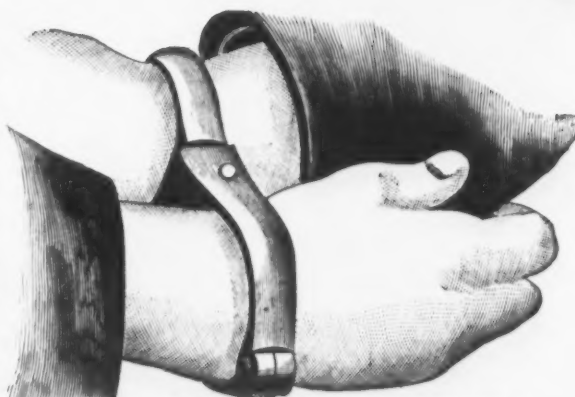
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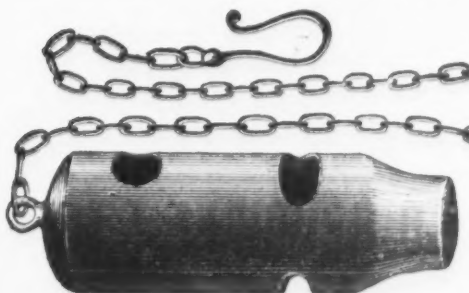
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BIANT  
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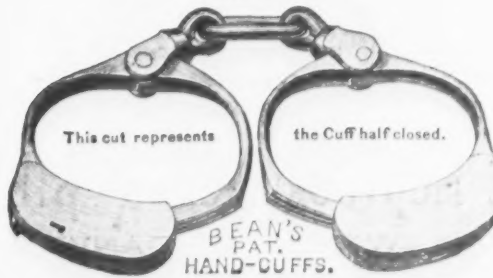
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Impossible for the Prisoner to remove them from his wrist either with or without the key.



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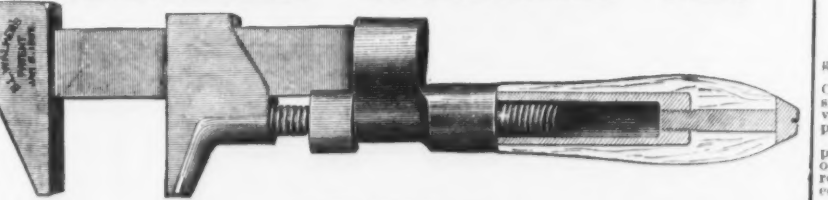
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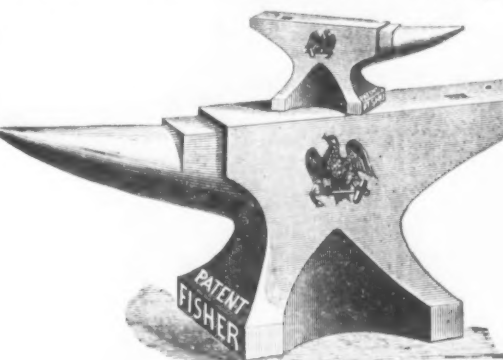
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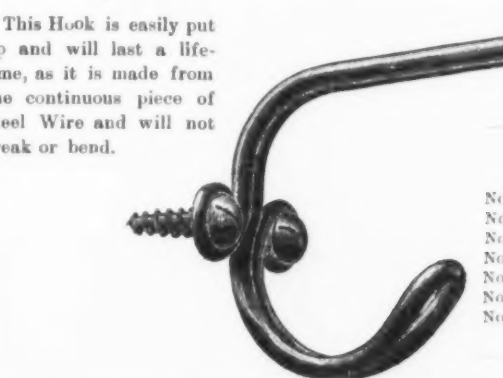
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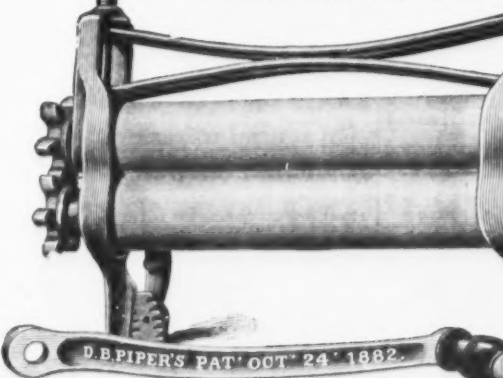
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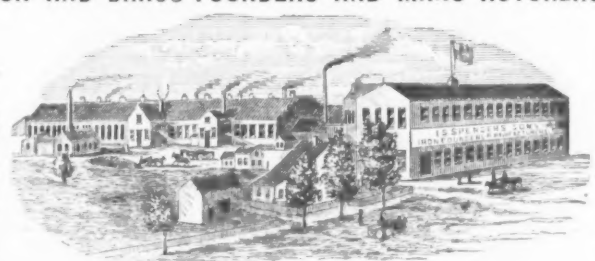
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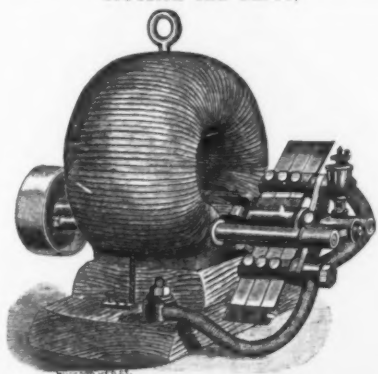
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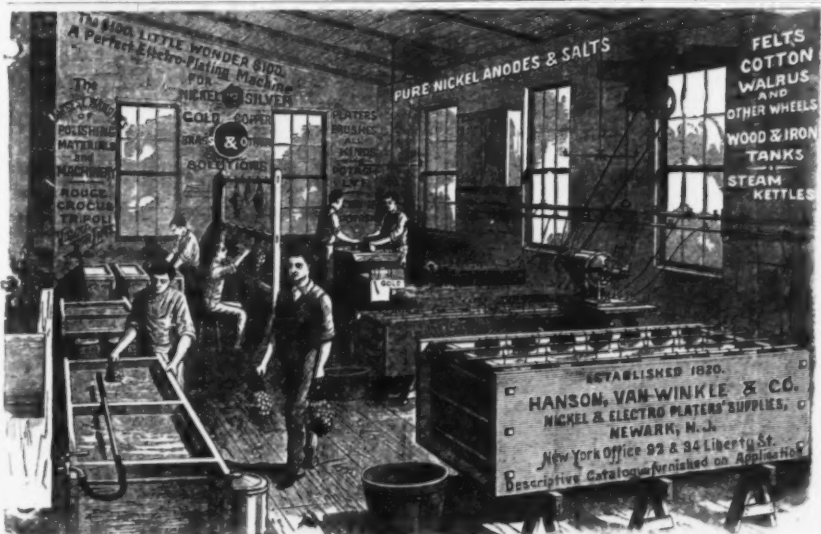
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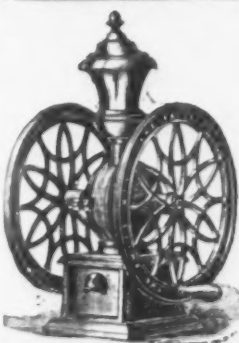
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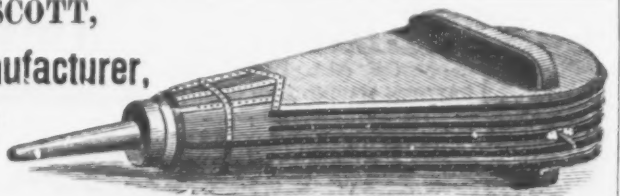
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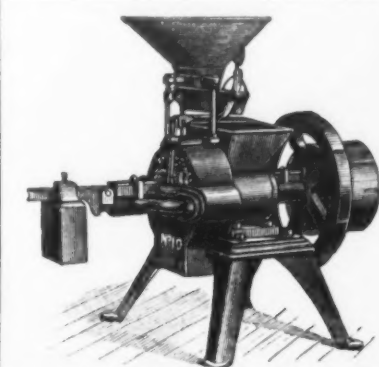
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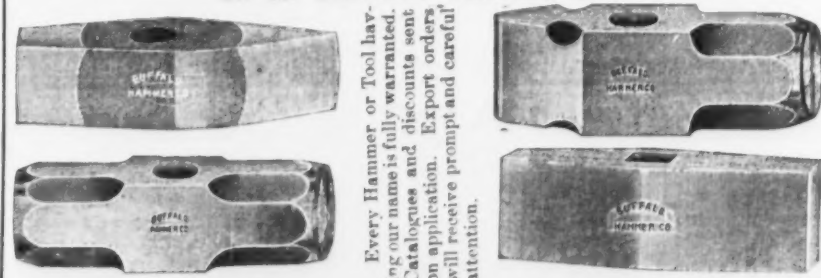
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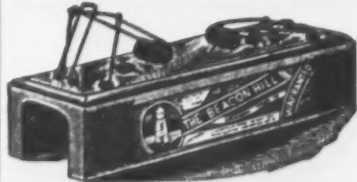
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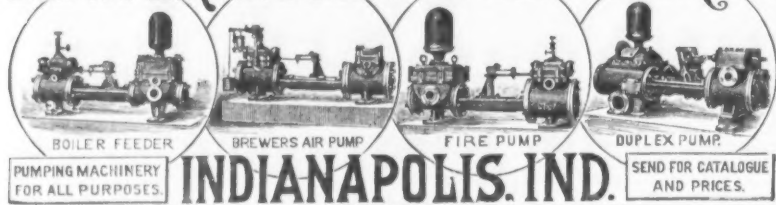
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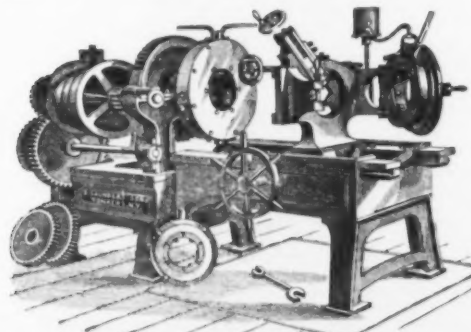
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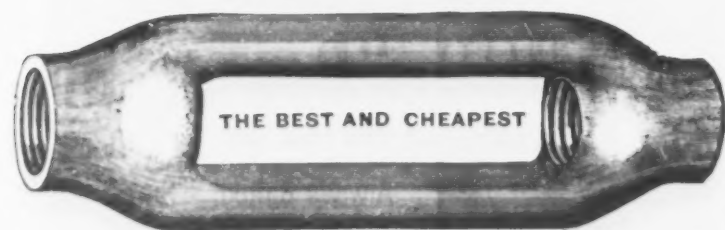
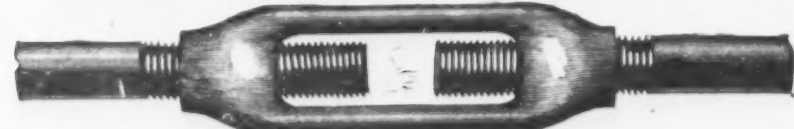
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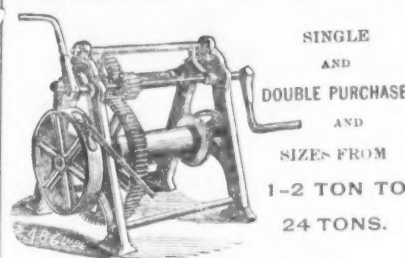
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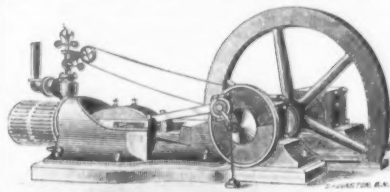
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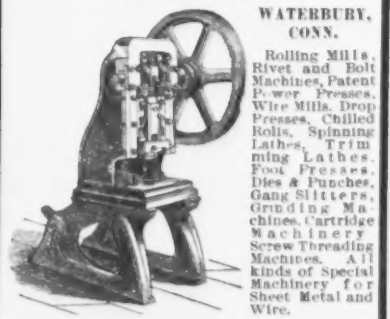
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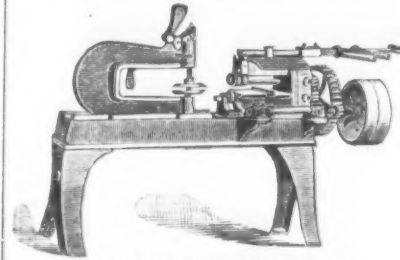
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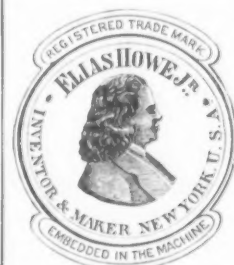
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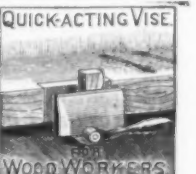
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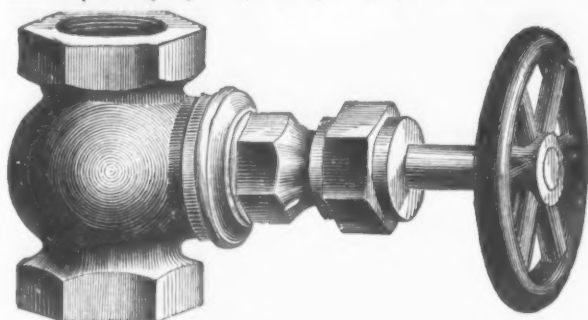
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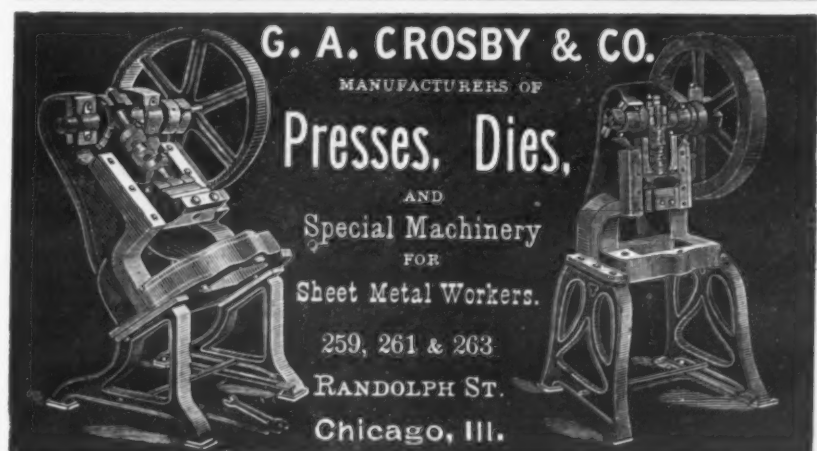
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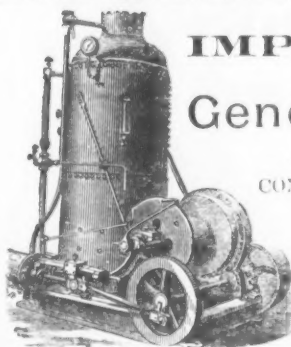
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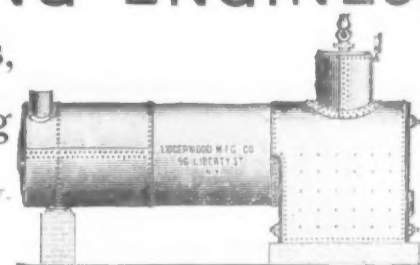
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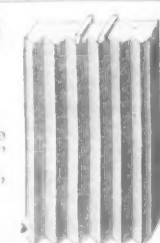
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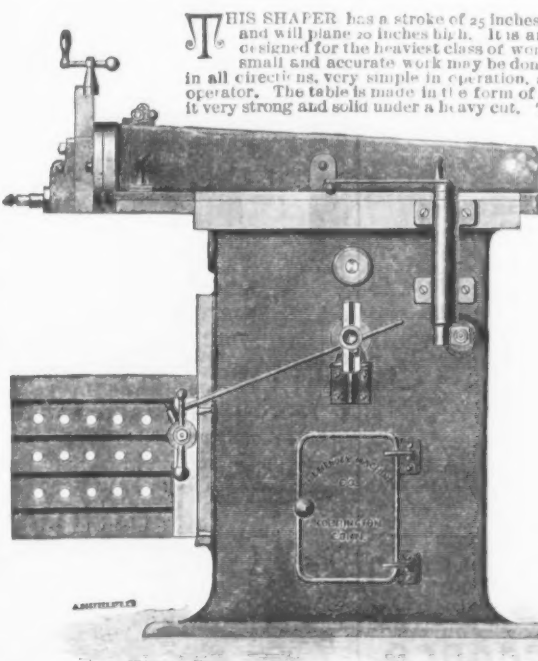
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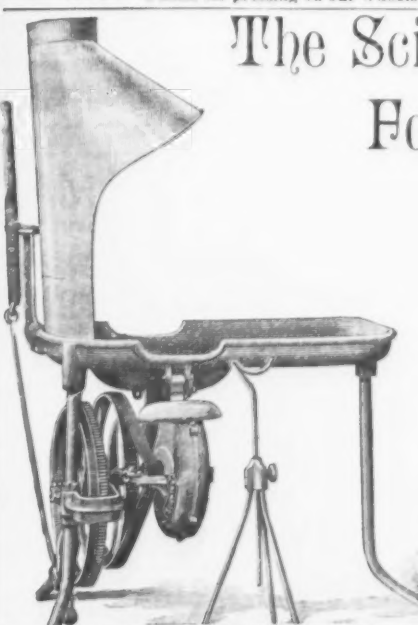
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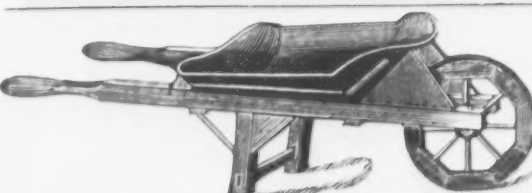
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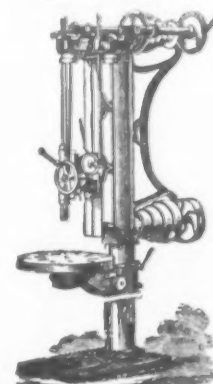
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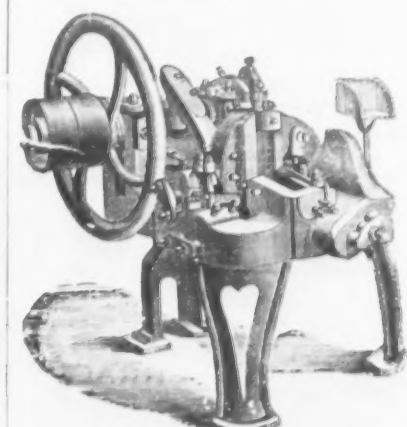
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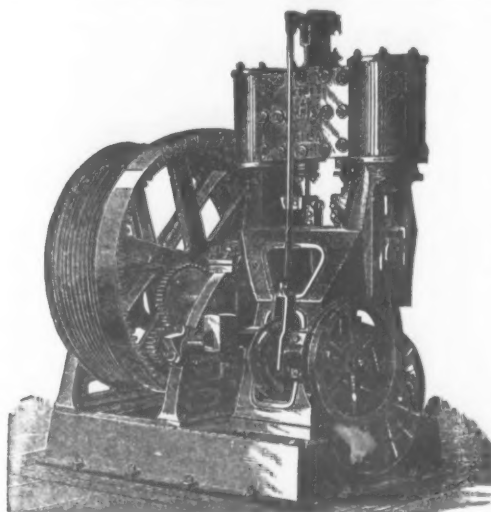
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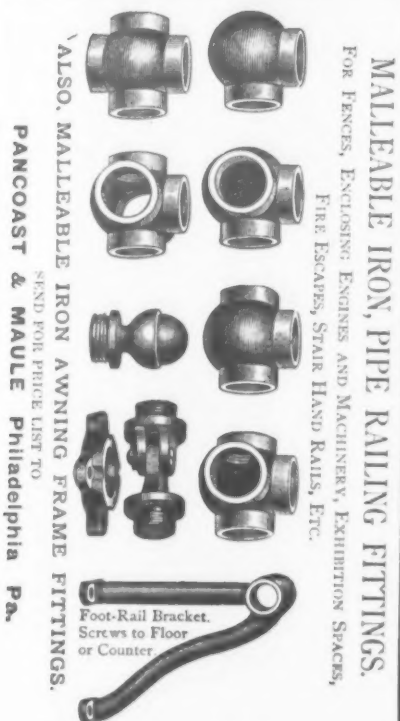
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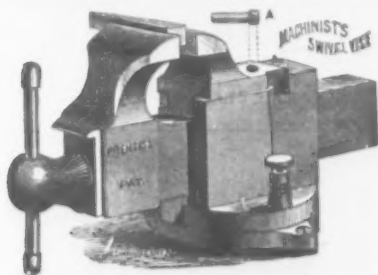
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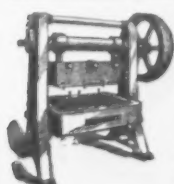
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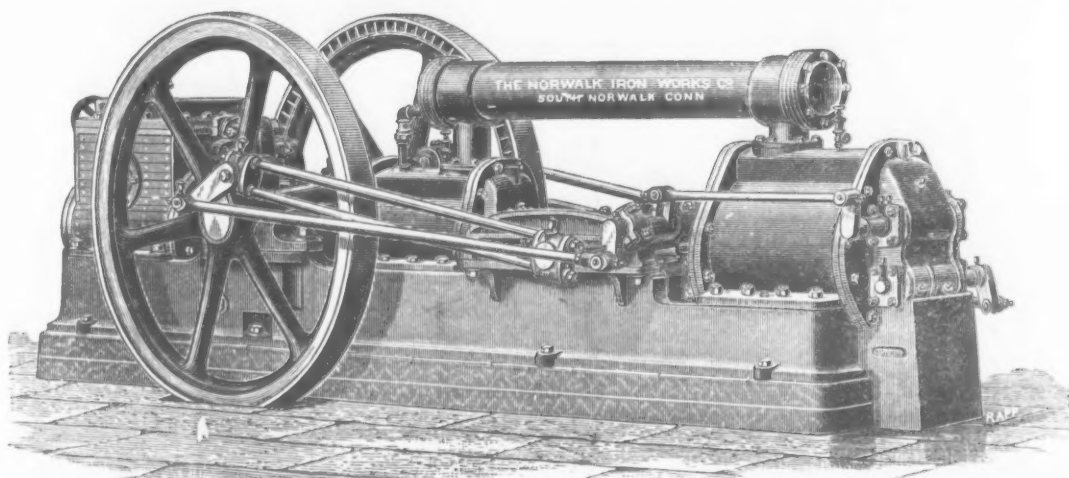
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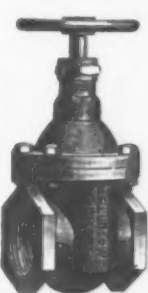
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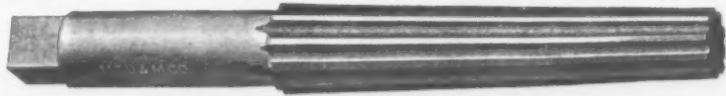
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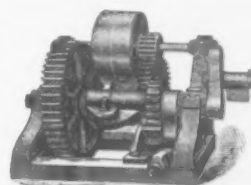
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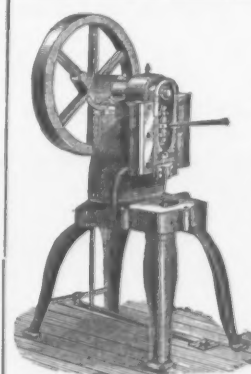


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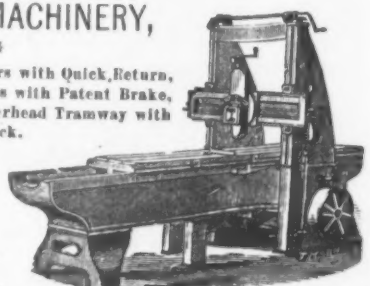
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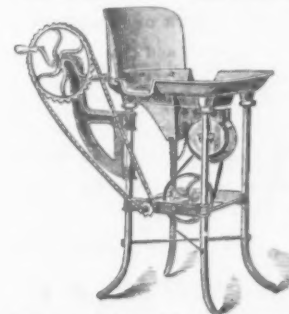
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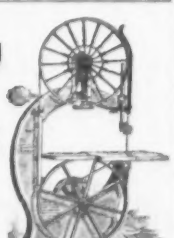
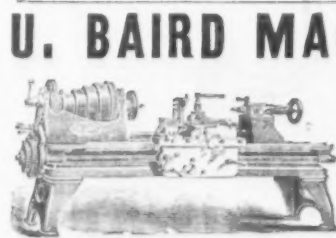
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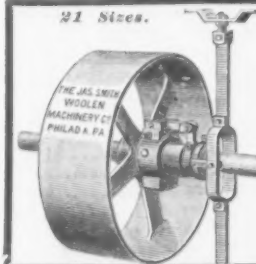
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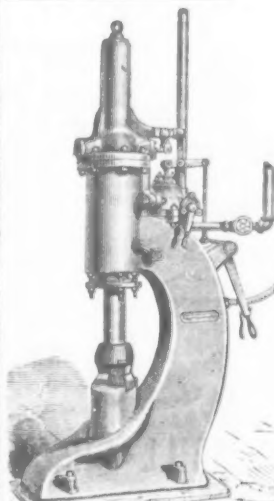
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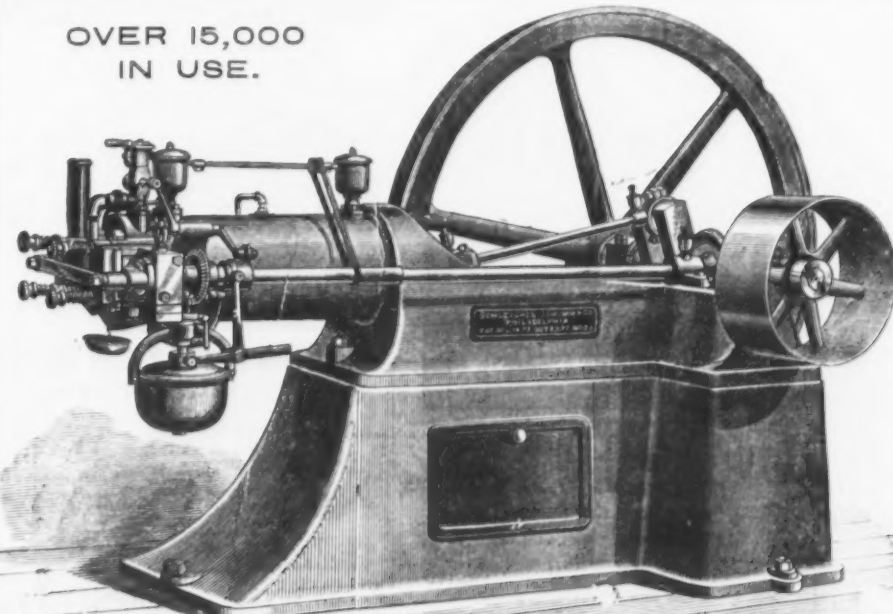


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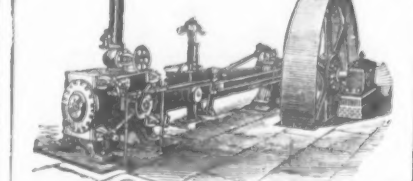
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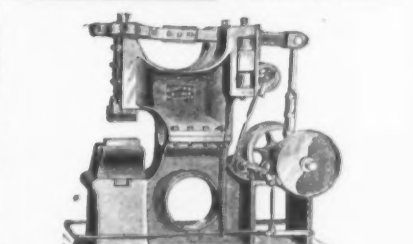
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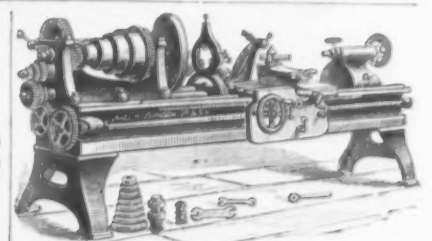
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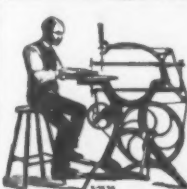
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